MI Great Lakes Plan:

Our Path to Protect and Restore Michigan's Natural Treasures

Revised October 2008

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Our Path to Protect and Restore Michigan's Natural Treasures

Background

The Great Lakes are Michigan's natural resource treasures. They shape our state, our lives and our economy. But these treasures demand increased attention at the state, local, and national levels. In response to this need, the Michigan Office of the Great Lakes (OGL) and Michigan United Conservation Clubs (MUCC) will lead an effort to prepare and begin implementation of an action agenda to protect, remediate and restore the Great Lakes.

This new effort builds upon the tremendous investment of time, passion, and money this state has made to protect, restore, and remediate the forces that continue to threaten the health of the Great Lakes. Michigan has been a leader within the Great Lakes region in protecting these spectacular waters. State and local units of governments have invested billions of dollars towards this effort. We have nurtured a sport fishery that is unrivaled in the world. Michigan was the first Great Lakes state to ban the discharge of ballast water at our ports. Visitors come from far and wide to play on our state and local beaches, launch their boats at publicly owned access sites, and camp in the state parks that line our shoreline. These and other actions that have been undertaken are highlighted in the State of the Great Lakes report at http://www.michigan.gov/documents/deq/deq-ogl-StateGLRpt2007_219068_7.pdf.

Great Lakes Governors' Priorities

In 2003, looking towards a vision that the Great Lakes will be the premier freshwater resource in the world and will sustain a healthy environment, strong economy, and high quality of life long into the future, the Great Lakes Governors adopted nine priorities that embody the goals of protecting and restoring the natural habitat and water quality of the Great Lakes Basin, preserving diverse plant and animal communities, protecting the water supply, and safeguarding human health. Acknowledging that the state and local entities have already invested and will continue to invest significant resources in efforts designed to attain these goals, the Great Lakes Governors asked that the federal government also make a long-term, large-scale financial commitment to the Great Lakes.

Each segment of a stream is supported from and dependent upon the land within its watershed. The efforts to protect and restore Michigan's waters will recognize the importance of looking to our rivers and nearshore areas as the vital link between the state's watersheds and the health of the Great Lakes. In addition, the efforts of state and local watershed groups to protect and restore the watersheds within the Great Lakes will be recognized and celebrated.

Vision for Michigan's Great Lakes Protection and Restoration Effort

Whether you're looking over the rocky shores of Lake Superior, watching the sun rise over Lake Huron, climbing the dunes on Lake Michigan, walleye fishing on Lake Erie or just enjoying a walk along the river that runs through your town, we in Michigan are united by the beauty, the wonder, and the power of water. It is in these moments that we feel our connection to the water, and it is this water that is our state's defining resource and that gives Michigan its sense of place.

It is our collective vision that the Great Lakes and the rivers bringing water to the Great Lakes will be the premier freshwater resource in the world and will sustain a healthy environment, strong economy, and high quality of life long into the future. This includes the vision of a sustainable Great Lakes ecosystem that ensures environmental integrity and supports economically viable and healthy communities. It is also our vision to protect and restore into the future the integrity of the Great Lakes ecosystem through collaborative partnerships. This vision includes a Great Lakes system where we have:

- Ensured that no new aquatic invasive species (AIS) are introduced into Michigan waters and onto Michigan lands.
- Conserved and enhanced Michigan's fish and wildlife by protecting and restoring the ecological processes that sustain them.
- Adopted a long-term goal of virtually eliminating the release of, and exposure, to persistent bioaccumulative toxics (PBT) and other toxics substances into the Great Lakes Basin ecosystem to protect human health, fisheries and wildlife populations and the aquatic environment.
- Restored the beneficial uses currently impaired at the 14 Michigan Areas of Concern (AOC).
- Controlled pollution from nonpoint sources (NPS).
- Used standardized and scientifically valid data to make the best decisions.
- Incorporated the principles of sustainability into their principles and practices the activities of Michigan's citizens and public and private entities while sharing a commitment to protect and enhance and be wise stewards of the waters, lands and related resources of the state of Michigan.

State, local and federal governments; private business; citizens and others have invested and will continue to invest significant resources in programs designed to attain this vision. It is our vision that this partnership continue and that the effort will foster increased collaboration and coordination necessary to address the critical issues identified in this report.

As the 2005 Brookings Institute report, Healthy Waters, Strong Economy: The Benefits of Restoring the Great Lakes System concluded, we are confident that the efforts identified in the MI Great Lakes Plan will have significant economic benefit to the state of Michigan and the Great Lakes region. We believe that they will:

- Lead to direct short and long-term economic benefits,
- Directly raise coastal property values,
- Reduce costs to municipalities, and
- Produce economic activity by making the state and the region more attractive to business and workers.

This effort is not intended to identify every action necessary to protect and restore the Great Lakes. Such a list would be exhaustive and dated. This effort is intended to consider existing resources, identify those protection and restoration efforts that can make a significant impact on the Great Lakes and provide a guide for moving forward to seek collaboration and additional resources, where needed. It is also important to realize that significant efforts are already underway and the need to continue and expand those efforts is essential to the continued improvement of the Great Lakes system.

MI Great Lakes Plan

The Great Lakes Regional Collaboration (GLRC) Strategy reflects the protection and restoration efforts needed throughout the Great Lakes basin. When completed, the MI Great Lakes Plan: Our Path to Protect and Restore Michigan's Natural Treasures (MI Great Lakes Plan) will provide specific direction within Michigan to address the recommendations of the GLRC and take further steps to address the specific needs within the state.

A key component of the effort will be to stress that the health of the Great Lakes is dependent on the health of the waters that feed the lakes, and the near-shore areas that buffer the lakes. Where possible, Michigan Great Lakes restoration efforts will focus on improving the health of our coastal areas, controlling AIS, restoring Michigan's 14 AOCs, controlling NPS, and reducing the effects of toxic pollutants.

Great Lakes Regional Collaboration

The Great Lakes Regional Collaboration (GLRC) was initiated through the issuance of a Presidential Executive Order calling for improved federal coordination and efficiency of Great Lakes programs through the initiation of "a regional collaboration of national significance" to create a national action agenda for the Great Lakes. Michigan and others joined the GLRC in the belief that an additional long-term, large scale federal funding commitment is necessary to address restoration goals. The GLRC culminated with the release of the GLRC Strategy (http://www.glrc.us) in December, 2005. The report provides specific restoration strategies and recommendations for the Great Lakes restoration priorities.

The OGL, working with representatives of the departments of Environmental Quality, Natural Resources, Agriculture, Community Health, Public Service Commission, History, Arts and Libraries, Labor and Economic Growth, Transportation, and Travel Michigan developed Internal Action Teams based on eight priority areas for restoration identified by the Great Lakes Governors'. The eight restoration priority areas are:

- Aquatic Invasive Species
- Habitat/Species
- Coastal Health
- Areas of Concern/Sediments
- Nonpoint Source
- Toxic Pollutants
- Indicators and Information
- Sustainable Development (including sustainable energy and assuring a strong economy)

In addition, the recommendations of the MUCC report, Michigan's Role in Great Lakes Protection and Restoration; Analysis and Recommendations, which includes a gap analysis comparison of the GLRC Strategy recommendations and Michigan's current activities, programs and policies, were also used as a basis for the draft action framework.

In July 2008, Michigan state agencies developed a draft action framework identifying actions necessary for protecting and restoring the Great Lakes. This draft action framework was intended to provide a starting point for discussion of actions necessary to protect and restore the Great Lakes. On August 6, 2008, over 100 key stakeholders met to review the draft action framework. The stakeholders provided conceptual recommendations and assisted in identifying specific efforts that should be included in the final MI Great Lakes Plan.

The MI Great Lakes Plan development process will include a series of geographically focused input sessions, recognizing the importance of local watershed efforts. At the conclusion of the input sessions, a final MI Great Lakes Plan will be prepared. As part of the process, we will be celebrating heroes throughout the state recognizing the tremendous local work that is occurring at the watershed level to protect, remediate, and restore the Great Lakes.

Also, once the MI Great Lakes Plan has been completed, an Implementation Team will be developed to assist state and local efforts to implement the recommendations of the MI Great Lakes Plan. The Implementation Team will track implementation of the recommendations identified in the final report and will promote the cooperation and collaboration needed to ensure successful implement of the recommendations. This will include identifying funding alternatives and data needs to most effectively implement the recommendations.

Michigan's Priorities

At this time, no determination of priority has been made for the recommendations in the report.

Aquatic Invasive Species

Background

Aquatic invasive species (AIS) are a serious problem in Michigan. The aquatic ecosystems and water infrastructure of the state are under assault by AIS already here and are threatened by new invasions. Significant progress over the previous three decades to restore the Great Lakes has been interrupted and undermined by the present crisis of AIS. Industrial and municipal water infrastructure in Michigan has incurred significant costs associated with control of AIS. Water recreation of all types is seriously impacted by AIS, to the detriment of present and future use of the state's waters. An AIS is defined as a plant or animal: 1) that is not native, and 2) whose introduction causes, or is likely to cause, economic or environmental harm or harm to human health.

AIS arrive in Michigan and spread throughout the state via a number of pathways, including ballast water in ships, recreational activities, and organisms in trade. Closing the pathways will take a coordinated effort on the part of governmental agencies, businesses, and water users. Michigan should develop a long-term funding proposal to secure state funding for AIS prevention and management.

Success Stories

Ballast Water Regulation: Governor Jennifer M. Granholm signed bipartisan legislation, Public Act 33 of 2005, to protect Michigan waters from AIS introductions from the ballast water of oceangoing vessels. Ballast water discharges from ocean-going ships are now required to be treated by methods determined by the Michigan Department of Environmental Quality (MDEQ) to be effective in preventing the discharge of AIS. The new ballast water permitting process allows MDEQ to monitor and regulate the ballasting and de-ballasting activities of oceangoing vessels engaging in port operations in Michigan. When no discharge is planned, operators of oceangoing ships must provide written certification to the MDEQ that ballast water will not be discharged into the waters of the state while in port. The Ballast Water Control General Permit came into effect January 1, 2007. As of October 2007, MDEQ had issued 83 permits to 28 international shipping companies to conduct port operations in Michigan. A lawsuit was filed in federal court in Detroit by shipping interests, who sought to nullify Public Act 33 of 2005; however, a federal judge dismissed the suit determining the statute was clearly rational and valid due to the fact that Michigan is facing a serious threat to its environment caused by AIS, has determined the likely avenues by which those species are being introduced, and has taken measures to stop this introduction. MDEQ will continue to require permits for oceangoing vessels and in the absence of protective federal policies, encourages other Great Lakes states to enact laws to regulate ballast water discharges and further protect the Great Lakes from AIS.

Phragmites Control Demonstration: Phragmites australis, also known as common reed, is a perennial, wetland grass that can grow to 15 feet in height. While Phragmites australis is native to Michigan, an invasive, nonnative, variety of phragmites is becoming widespread and is threatening the ecological health of wetlands and the Great Lakes coastal shoreline. Phragmites tend to create dense stands which degrade wetlands and coastal areas by crowding out native plants and animals, blocking shoreline views, reducing access for swimming, fishing, and hunting, and potentially creating fire hazards from dry plant material. In response to the growing need to address the rapid spread of phragmites in Saginaw Bay, and to better communicate effective treatment methods and regulatory requirements to the public, the MDEQ and the Michigan Department of Natural Resources (MDNR) in partnership with U.S. Environmental Protection Agency (USEPA)-Great Lakes National Program Office (GLNPO) are cooperating with other agencies and local stakeholders to implement a phragmites control demonstration project along selected reaches of phragmites-infested public and private owned shorelines (e.g., Great Lakes coastal wetlands). The MDEQ has received funding from the GLNPO for this effort. Other contributors to this project include Ducks Unlimited, Cygnet Enterprises, Consumers Energy, and Hampton Township. The project will demonstrate control methods for phragmites that can result in restoration of native plant communities, shoreline views, and recreational activities. The control plots will be chemically or mechanically treated to demonstrate to landowners the effectiveness of the treatment method and the benefits of managing phragmites on their property. The treatment site consists of five demonstration plots including: mowing, treating with the herbicide Imazapyr, treating with the herbicide glyphosate, treating with an imazapyr/glyphosate mixture, and comparing treatment sites to an untreated control site.

Michigan's Aquatic Invasive Species Prevention and Control Goal

Prevent all new introductions of AIS into Michigan, stop the spread of AIS within the state and clearly identify and organize responsibilities and authorities for AIS prevention, control, monitoring, regulation and outreach/education within the appropriate state agencies.

Priority Actions

The AIS section could be prioritized emphasizing closing the most significant pathways for AIS first through regulation and information/education. Priorities could be further determined within each area and/or within each agency or non-governmental organization.

Near Term Actions

A. Michigan should continue to implement the state's first-in-the-nation ballast water control permit for ocean-going ships to address the ballast water pathway to prevent introduction and spread of AIS into and among Michigan's ports.

Recommendations that Can be Accomplished within Existing Funding Constraints through Increased Collaboration

It should be noted that Michigan currently has limited funding for the efforts identified below; however, if the AIS goal is to be achieved, continuation of existing programmatic funding is essential.

A. Michigan should communicate to the public the responsibilities and authorities for AIS prevention, control, monitoring, regulation and outreach/education among the appropriate state agencies.
B. Michigan should continue to coordinate the Great Lakes ANS Coalition entered into with other states in the Great Lakes basin to implement on a basin-wide basis water pollution laws that prohibit the discharge of AIS into the Great Lakes from oceangoing vessels.
C. Michigan should ensure that vessels operating exclusively within the Great Lakes, "Lakers" are not a vector to reduce the spread of AIS and diseases already in portions of the Great Lakes.
D. To prevent introduction and spread of AIS in Michigan waters through trade (e.g. water gardening, bait, aquariums, live food, etc.), Michigan should use a science based approach to develop a list of species of concern for Michigan and an immediate moratorium by the state on the trade of species on that list, until the species are screened and approved for trade under federal law. In addition, Michigan should organize and codify all the laws, regulations, mandates and rules dealing with the trade of live organisms.
E. Michigan should fully participate in the Great Lakes Fishery Commission's sea lamprey control program and continue to provide regulatory input for the process.
F. As invasive species are identified under habitat protection and restoration programs and pesticides are considered as a tool for control, Michigan Department of Agriculture (MDA) should be consulted for input on legal pesticide use recommendations, availability of pesticides registered for use in Michigan and definition of correct pesticide applicator certification and licensing categories and pesticide use regulations. In situations where endangered or threatened species are identified at risk, MDA should be consulted when pesticide use is considered. State and federal pesticide authorities offer a mechanism to either make tools available (under special registration) or restrict use (under specific label use direction) to attain the desired outcome.
G. Michigan should integrate an evaluation component into future educational efforts to ensure AIS outreach and education programs targeting stakeholders are achieving desired results to maximize actions that prevent and control AIS in Michigan. In addition, evaluation components should measure stewardship changes leading to a decline in introductions whenever possible.
H. Michigan should undertake a pathway analysis and identify appropriate closure actions. This information should be included in the state's AIS management plan.
I. Michigan should review the effectiveness of AIS state laws, at both the state level and in concert with federal laws.

Recommendations Needing Additional Funding to Accomplish

It should be noted that Michigan may have limited funding for some of the efforts identified below; however, if the AIS goal is to be achieved, significant new resources will be essential.

A. Michigan should identify means to significantly increase resources for the enforcement of laws governing the trade of live organisms and develop and fund an outreach and education plan for information dissemination to retail outlets that deal in the trade of live organisms when new animals or plants are added to the restricted or prohibited species list.

B. Michigan should develop voluntary agreements and codes of best practices for industrial trade groups to prevent new introductions. In addition, economic requirements and incentives should be investigated to encourage commitment and successful implementation of these agreements and best practices (e.g., bonds or insurance).

C. Michigan should establish an early detection and rapid response program for AIS new to the state including:
   - Establishing a $1 million revolving fund for rapid response actions;
   - Collaborating with an interagency, Great Lakes Federal Rapid Response Team, that will conduct activities on federal lands, and in other locations with State, Tribal, and local cooperation;
   - Identifying a central monitoring coordinator [e.g., National Oceanic Atmospheric Administration (NOAA) or MDEQ] and prioritizing monitoring based on risk by ranking all high risk species and high risk areas in Michigan.

D. Michigan should establish a coordinated data management system, through the Smithsonian Institution, the Great Lakes Environmental Research Laboratory, or other suitable entity, to develop an accessible, integrated, and centralized database that allows for the reporting and tracking of AIS infestations.

E. Michigan should develop a system for collection and identification protocols so people who believe they have discovered an AIS will know where to send a specimen, what parts of the specimen to send, and how to prepare the specimen for shipment. An integrated database must be created for this information and must be accessible to agency staff and to interested citizens. In addition, Michigan should identify specific taxonomic experts who can handle specimens of potential AIS to ensure species will be properly identified and verified. One way to accomplish this may be to expand and further fund the Great Lakes Aquatic Non-indigenous Species Information System database, which already has abstracts available for many of the invasive vascular plants found in the Great Lakes (http://www.glerl.noaa.gov/res/Programs/ncrais/search_notes.html) or to use the U.S. Geological Survey website for new invasives http://biology.usgs.gov/invasive/, which has a number of invasive species mapping initiatives occurring in other states.

F. Michigan should allocate funding to implement a system of enhanced monitoring and ecological surveys related to AIS in Michigan. All monitoring procedures must be continuously reviewed and audited and adaptive management should be used to continuously improve procedures.

G. Michigan should better document and quantify the economic impacts of AIS for Michigan decision makers (gross numbers plus local anecdotal

or case studies) as well as environmental impacts

H. Michigan should support research to develop and implement new control methods for uncontrolled species of concern.

I. Michigan should continue AIS-focused Hazard Analysis and Critical Control Point (HACCP) training and plan implementation for research and management agencies.

J. State agencies, academic institutions and other organizations should develop a strategy to identify means to secure funding support to conduct and evaluate cost-effective AIS vector-specific outreach and education programs such as programs targeting boaters and anglers (e.g., Clean Boats, Clean Waters). These programs should focus on behavior change and responsibility of resource users.

K. Michigan should encourage and recruit a champion/lead organization for a volunteer coalition of stakeholders on AIS prevention and control to enhance state AIS education and outreach and monitoring. For example, riparians, anglers, Great Lakes shoreline property owners and other groups who are the most likely to spot new AIS must be educated and trained to advance AIS monitoring efforts, as well as, education and outreach efforts.

L. Michigan should develop a comprehensive AIS Organisms-in-Trade educational campaign including the bait industry in coordination with the Sea Grant AIS-HACCP and Pet Industry Joint Advisory Council/Sea Grant/U.S. Fish and Wildlife Service (USFWS) Habitattitude campaigns.

M. Michigan should continue to increase coordination among organizations and agencies doing education and outreach on the issue of AIS and diseases in order to avoid duplicate efforts, use common messages whenever possible and increase effective use of limited resources. Michigan should also actively pursue and develop joint ventures between industry/government/academics (for example, Clean Marinas). In addition, the development of a comprehensive database of existing AIS education and outreach programs would also help to avoid duplication of efforts and improve communication within and between agencies and citizens about these programs and databases.

N. Michigan should support a program that educates all facets of the Great Lakes maritime commerce industry including ports, carriers, shippers, mariners, resource users and users of goods produced from cargoes transported to and from the Great Lakes by ships, about the urgency and cost-effectiveness of preventing/containing AIS, the status of prevention, and what is needed to advance prevention.

O. Michigan should develop a statewide strategy using an Integrated Pest Management approach, to identify invasive species in Michigan, to determine their potential to affect native landscapes and species, and to identify opportunities for control.

P. Michigan should identify and develop environmentally safe biological agents which can be employed to control invasive species.

Q. Michigan should identify and map areas of significant invasive species concentrations to inform management decisions.

Recommendations Needing Congressional or Federal Agency Action

A. Michigan should work with the Great Lakes congressional delegation in support of effective and timely federal legislation for control of AIS in ballast water.

B. Michigan should encourage development of a federal screening tool for species prior to importation to the United States and until an effective

process is in place, the USFWS should continue to list AIS as injurious species under the Lacey Act.

C. Michigan should work with the Great Lakes congressional delegation to support passage of comprehensive legislation for prevention and control, including increased allocation of funds for development and implementation of state and interstate Aquatic Nuisance Species management plans through the Aquatic Nuisance Species Task Force (ANSTF), with a particular emphasis on the immediate use of techniques to control or slow the spread of AIS.

D. Michigan should work with the Great Lakes Great Lakes congressional delegation in support of the Great Lakes Commission's Legislative Priorities for FY 2009 that are of importance to Michigan including:

- Funding be appropriated to the USACOE to complete construction and operation of the dispersal barrier system in the Chicago Sanitary and Ship Canal and also for the authorized study on hydrologic separation of the Great Lakes from the Mississippi River basin.
- Increase funding to current AIS prevention and control programs, including:
  - o $11.25 million for the Section 1101 program to prevent the introduction and spread of AIS from vessels, including $6 million to U. S. Coast Guard, $2.5 million to USEPA, $2.75 million to the ANSTF, $1.5 million to USFWS and $1.25 million to NOAA;
  - o $1 million to USFWS to support the six regional AIS panels under the ANSTF;
  - o $8 million to USFWS to support state-specific AIS management plans;
  - o $1 million to support model regional, state and local rapid response contingency strategies; and
  - o $22 million to implement the sea lamprey control program.

Recommendations Needing Michigan Legislative Action

A. Michigan should work with the Michigan legislature to develop a viable, long-term funding source for AIS prevention and control actions.

B. Michigan should work with the Michigan legislature to increase funding within the MDNR and MDA for the education, enforcement and monitoring of the bait industry, aquaculture facilities, and the ornamental fish and plant trade to ensure adequate monitoring of all species that may eventually find their way to the waters of the state.

C. Michigan should work collaboratively with all interested parties to achieve the support of the executive and legislative offices for sustainable funding for a Michigan AIS program. Without their support, Michigan's AIS program will be less than effective.

Restoration Recommendations by Watershed/Region

- To be developed after the regional input sessions -

Habitat/Species

Background

With nearly 4,000 miles of Great Lakes shore, Michigan has the longest coastline of any state in the contiguous United States. Seventy major watersheds drain through 36,000 miles of rivers and tributaries. Michigan's shores are home to Pictured Rocks National Lakeshore and Sleeping Bear National Lakeshore, Isle Royale National Park, and the Thunder Bay National Marine Preserve and Underwater Sanctuary. Michigan's vast resources also include nearly 600 islands, over 60 shoreline state parks, more than 50 State wildlife, game or wildlife research areas, and numerous county and township parks. In addition, Michigan's shoreline holds all the state's commercial and recreational harbors, more than 35 ports, the U.S. side of the Detroit River International Wildlife Refuge, several federal wildlife refuges, all of the state's designated Environmental Areas, critical dunes, and parts of several state and national forests.

The terrestrial and aquatic ecosystems in Michigan's Great Lakes basin have been altered due to human development and activity, resulting in the loss or degradation of many natural communities, threatening the ecosystem and the species they support. Key threats include:

- loss of habitats in the highly productive nearshore and coastal zone as a result of development, boating and shipping activity, shoreline hardening and water quality degradation,
- disruption of sediment transport and other coastal processes,
- contaminant releases and continual uptake by fish and wildlife,
- loss of wetlands, floodplains and riparian buffers, and
- habitat fragmentation affecting both terrestrial and aquatic organisms as a result of dam construction and other manmade barriers.

Michigan has lost approximately half of its original wetlands. Other important community types such as savannah, lakeplain prairies, critical dunes and wooded dune and swale complexes have also been heavily impacted. Changes in community type, patch size and distribution have contributed to numerous plant and animal extirpations throughout the Great Lakes basin.

These impacts directly affect human health, economic vitality and sustainability, and regional prosperity, as well as the biodiversity of Great Lakes wildlife, fish, and plant species and their habitats. Natural ecological processes contribute to the social and economic stability of the region and the nation. Millions of people depend on the Great Lakes and inland freshwater sources for water supplies for consumption, manufacturing, transportation, power generation and recreation. Current estimates indicate that boating, fishing, hunting and wildlife watching generate significant economic activity annually and support thousands of jobs in Michigan's tourism industry. Healthy and diverse Great Lakes ecosystems are also of great value to the tribal nations

who rely on these resources to meet their subsistence, economic, cultural, spiritual, and medicinal needs.

The causes and impacts of species loss and habitat degradation are many and transcend state boundaries. Unfortunately, the degradation of Michigan's coastal communities is difficult to quantify due to the lack of a consistent, on-going, science based inventory and monitoring program. The benefits of Great Lakes protection and restoration efforts extend far beyond Michigan. Successful campaigns for the protection and restoration of the Great Lakes ecosystem requires substantial financial resources, the talents of a broad range of stakeholders, and coordination among local, state, tribal, federal, and international agencies. In addition, successful protection of ecosystem components, particularly plant communities and the species they support will require the education of landowners, since more than 80 percent of these important resources are privately held.

Numerous policies, regulations, and ongoing management efforts in Michigan have been developed to address these issues. However, funding levels are insufficient to make improvements that are needed now. Michigan's environmental protection and resource restoration activities have demonstrated that smaller successes can be achieved at modest levels of effort. Budget constraints at the state level limit the capacity to execute existing authorities and to implement needed restoration initiatives. A coordinated, concentrated effort, at a broader scale, with a focus on the initial priorities for protection and restoration efforts, will help to address impacts to Great Lakes ecosystem health.

Success Stories

Coastal and Estuarine Land Conservation Program (CELCP) - With the launch of a new coastal habitat acquisition program, Michigan has taken a great stride toward the Great Lakes Regional Collaboration Strategy's goal of "enhancing fish and wildlife by restoring and protecting habitats and coastal wetlands." The new CELCP is a long-awaited addition to the Michigan Coastal Management Program's suite of resources available to address coastal habitat loss and fragmentation. Congress established the CELCP in 2002 to help states acquire coastal lands or interest in lands with significant conservation, recreation, ecological, historic, or aesthetic values. Lands with significant ecological value are Michigan's highest priority for protection. The NOAA administers the program at the federal level, and selects land acquisition proposals nominated by coastal states to compete for federal cost-share funds. Congress appropriated funding for the competitive grants for the first time in 2007.

A large parcel of land on the Keweenaw Peninsula will be Michigan's first acquisition made through this nationally competitive program. Michigan has received a $927,000 grant for acquiring the Seven-Mile Point property on Lake Superior. The 120-acre property includes 2,000 feet of Great Lakes shoreline, globally rare basalt bedrock beach, wooded ridges and swales, endangered species habitat, and a bedrock near-shore aquatic system. The addition of this property to the Gratiot River Watershed and Lake Superior Coastal Conservation Area will increase this conservation area to 4,090 acres and almost four miles of shoreline.

Saginaw Bay to Lake Erie Coastal Habitat Project - Ducks Unlimited has received a sixth North America Wetlands Conservation Act (NAWCA) grant for the Saginaw Bay to Lake Erie Coastal Habitat Project. This project secured $1 million of federal dollars to conserve habitat in an 18-county area that includes the coastal counties along Saginaw Bay and the watershed counties of Lake St. Clair and western Lake Erie. This effort drew support from one of the largest and most diverse set of conservation partners yet to participate in a NAWCA grant in Michigan, including 17 state, federal, corporate and non-profit organizations. These partners together pledged more than $2.4 million in matching funds toward this project that, when pooled with the grant dollars, will result in the conservation of more than 3,800 acres of wetlands and associated uplands.

Key acquisition projects planned under this grant include the permanent protection of 102 acres of coastal wetlands and lakeplain prairie along Saginaw Bay and the expansion of the Detroit River International Wildlife Refuge. Wetland and grassland restoration and enhancement projects are planned for the Shiawassee River State Game Area, St. Clair Flats Wildlife Area, Fish Point Wildlife Area, Quanicassee Wildlife Area, Bay City Recreation Area, Shiawassee National Wildlife Refuge, land owned by Detroit Edison along Lake Erie and on private lands throughout the 18-county project area.

Michigan Species Management and Habitat Protection Goal

Conserve, enhance and restore Michigan's fish and wildlife by restoring and protecting natural communities, the diverse habitats they provide and the ecological processes that sustain them.

Recommendations for Near-term Actions

A. Michigan should utilize the priority system established in CELCP plan to ensure all state funded coastal protection projects meet Michigan's protection priorities.
B. Michigan should continue to coordinate wetland restoration opportunities and funding through the Michigan Wetland Working Group.
C. Michigan should complete the update of the National Wetland Inventory (NWI) data using 1998 and 2005 aerial imagery. This project is currently in progress.
D. Michigan should continue designation of critical non-contiguous wetlands on public lands.
E. Michigan should continue to develop landowner education materials, including a Best Management Practices (BMPs) manual for property owners in designated Critical Dune Areas, to encourage the protection of important shoreline resources.
F. Michigan should continue to disseminate information on dam removal as part of routine dam safety correspondence.

Recommendations That Can be Accomplished within Existing Funding Constraints through Increased Collaboration

It should be noted that Michigan currently has limited funding for the efforts identified below; however, if the Habitat and Species goal is to be achieved, continuation of existing programmatic funding is essential.

A. Michigan should continue to evaluate wetland protection methods and explore opportunities to work with other agencies to protect these investments.
B. Michigan should work with the USEPA to mandate incorporation of wetland BMPs into watershed planning and implementation efforts.
C. Michigan should secure long term, stable funding to implement the Great Lakes Coastal Wetland Consortium's long term coastal wetland monitoring program. To cover a wider area of shoreline and reduce the cost of monitoring, the MDEQ should coordinate with regional non-profit groups willing to take on local annual monitoring programs.
D. To ensure protection and management of the natural coastal communities (i.e. coastal wetlands, dunes, bedrock shorelines, etc.) and the processes that sustain them (i.e., sediment transport, lake-level fluctuation, wetland migration, etc.) Michigan should permanently protect 500 acres of high priority coastal communities per year using funding from the CELCP, Coastal Zone Management Program, and the National Coastal Wetland Conservation Program, as well as other sources.
E. Michigan should develop a prioritization system for land acquisition and habitat and species protection and restoration efforts. In addition, Michigan should incorporate identified areas of great biological significance into local, regional, and statewide planning and management efforts.
F. When mitigation is necessary, MDEQ should make connections between regulatory actions and mitigation efforts to improve restoration efforts.
G. Michigan should secure funding for long-term monitoring to obtain data that can be used to assess and evaluate projects and develop approaches for adaptive management.
H. Michigan should promote closure of non-essential resource management roads and seek other road closure opportunities that do not conflict with appropriate uses.
I. To restore habitat connectivity and minimize fragmentation of terrestrial and aquatic environments, Michigan should:
    - Incorporate identified areas of great biological significance into local, regional and statewide planning and management efforts.
    - Improve coordination between natural resource conservation organizations, land trusts and transportation planners at local, regional and statewide scales, particularly when prioritizing projects. In addition, Michigan should also improve collection, analysis and access of data used for local, regional and statewide land-use and transportation planning to better assess and evaluate projects and programs.
    - Incorporate BMPs in construction, repair and replacement of stream crossings.
J. To reconnect key tributaries to the Great Lakes, Michigan should encourage the voluntary removal of dams where they serve little or no purpose and there is a reasonable expectation that removal will improve overall ecological function and improve the health of aquatic resources. These ef-

forts should include:

- Tracking dam location and function for use in providing recommendations for dam retention or removal.
- Consider developing a prioritization tool for dam removal and river restoration, including fisheries management.
- Consider developing a river restoration team comprised of representatives from MDEQ and MDNR that could facilitate outreach and information exchange for dam owners wishing to remove a dam.
- Assisting local communities in assessment of dams as part of a comprehensive watershed management and recreational planning. Develop and expand partnerships with nonprofit organizations and foundations to maximize distribution of information and leverage resources for river restoration and dam removal.
- Continuing to develop, test, and encourage dam operations that mimic natural riverine conditions and temperatures, protect and maintain desired aquatic communities, protect recreational uses, and, where possible, rehabilitate natural resources degraded by the dam.
- Research on the effects of timing and duration of impoundment drawdowns is needed to help minimize adverse effects to wildlife species that use impounded areas.

K. Michigan should take steps necessary to preserve natural stream structure and function to promote healthy aquatic and terrestrial environments. Where stream channels are modified or subject to restoration efforts, efforts to incorporate natural stream channel stability in engineered drainage channels, mimicking natural channel dimension, pattern and profile should be encouraged. Also, artificial techniques and engineering of new structures that mimic natural processes should be developed.

L. To maintain, enhance and rehabilitate self-sustaining species populations, Michigan should take steps necessary to conserve natural communities that provide habitats of high ecological significance across the state, with a special emphasis on developing and implementing recovery plans for endangered species.

M. To conserve natural communities or locations that provide critical habitats for rare, threatened or endangered species and rare or unique communities such as dunes and islands Michigan should continue to implement Michigan's Wildlife Action Plan including activities such as:

- Integrating current information regarding unique landscape communities, including unique aquatic habitat types;
- Developing a gap analysis to identify priority areas for future conservation and protection measures;
- Assisting private landowners and create partnerships between conservation organizations/agencies and private landowners for conservation of wildlife and landscape features; and
- Educating the public about primary threats to wildlife and natural features, biodiversity and essential ecological processes.

N. Michigan should continue to develop and evaluate lake trout restoration efforts using guidance from existing fishery management plans.

O. Michigan should continue to assess factors involved in recruitment of lake trout and other important native species, and remove or mitigiate impediments to recruitment.

P. Michigan should continue restoration efforts to re-establish lake sturgeon in the areas where they have been extirpated from the Great Lakes by

implementing recommendations in the Lake Sturgeon Rehabilitation Strategy. Restoration efforts should also be implemented to re-establish coregonines in areas where they have also been extirpated.

Q. To restore key fish species populations such as lake trout and brook trout, Michigan should implement actions identified in the National Fish Habitat Action Plan (e.g., improving road crossings, implementing BMPs, and addressing repair of perched culverts).

R. Michigan should continue funding habitat and species research to address information needs of natural resource agencies.

Recommendations Needing Additional Funding to Accomplish

It should be noted that Michigan may have limited funding for some of the efforts identified below; however, if the Habitat and Species goal is to be achieved, significant new resources will be essential.

A. Currently, Michigan is restoring approximately 4,000 acres of wetland per year. Michigan should restore 500,000 acres of wetlands (10% of historic losses) and establish up to 1,000,000 acres of associated upland grassland buffers around the restored wetlands at a rate of 2 to 1 ratio (e.g., 2 acres upland to 1 acre wetland) by 2079, which will be the 100 year anniversary of Michigan's Wetland Protection Statute. Within the next 3 years, Michigan should restore 18,000 acres of wetlands and establish up to 36,000 acres of associated upland grassland buffers around the restored wetlands. Achieving this 3 year goal will require a 50% increase (6,525 acres per year) in Michigan's current rate of wetland restoration under the Wetland Reserve Program (WRP), Conservation Reserve Enhancement Program (CREP) and the Partners for Fish and Wildlife Program.

B. Michigan should permanently protect 50,000 acres of high quality wetlands and 100,000 acres of associated upland buffers at a rate of at least 1,000 acres of high quality wetland and 2,000 acres of associated upland per year through the establishment of conservation easements or fee simple purchase.

C. Michigan should take steps to enhance the state's partnership with the Federal Farm Service Agency's (FSA) CREP by:
   - Taking steps to complete Michigan's current CREP agreement which calls for a total of 85,000 acres of conservation practices to enhance water quality and wildlife habitat; and
   - Working with the FSA to expand areas of Michigan eligible for this funding. Currently, CREP is limited to the Saginaw Bay watershed, the Lake Macatawa watershed, the River Raisin watershed and several small watersheds in the western Lake Erie basin.

D. To better evaluate and track the success of wetland restoration programs, Michigan's Wetland Working Group should create a restoration tracking system. This tracking system must be limited to information that does not violate Federal Farm Bill privacy provisions (i.e. limited to acreage of wetlands restored, Town, Range and Section information, etc.) to protect the interests of private landowners.

E. To ensure wetland conditions throughout the state are sufficient to provide a full range of ecosystem services including hydrological retention, nutrient and sediment trapping, the provision of spawning, nesting, nursery and other habitat needs of fish and wildlife and to ensure that the

state can adequately and accurately gauge the status and trends in wetland condition throughout the state, Michigan should develop a statewide systematic monitoring and inventory program to assess wetland quality by incorporating the evaluation of wetlands into routine basin-wide water quality monitoring. This action is further defined in the Indicators and Information section of this report.

F. Michigan should ensure that natural coastal communities (i.e. coastal wetlands, dunes, bedrock shorelines, etc.) and the processes that sustain them (sediment transport, lake-level fluctuation, wetland migration, etc.) are protected and managed and that coastal communities sustain diverse and abundant populations of native resident and migratory fish and wildlife species. This effort should include:
   - Completing a statewide inventory of shoreline type, erosion rates, and shore protection structures along Michigan's Great Lakes shoreline, and implement a plan to track future changes in the length of the structured shoreline.
   - Conducting a statewide assessment of existing critical dune areas to inventory historic land use changes and associated impacts in the regulated dune areas and to prioritize dune areas to be protected through acquisition.
   - Completing development of the delisting targets for those Areas of Concern (AOC) that have Beneficial Use Impairments (BUIs) for the "Loss of Fish and Wildlife Habitat" and "Degraded Fish and Wildlife Populations" and initiate restoration efforts to address and remove these BUIs.

G. Michigan should develop a statewide strategy to reduce or eliminate the construction of new shoreline protection structures along Michigan's Great Lakes shorelines, thereby encouraging healthy and naturally protective beach environments.

H. Michigan should coordinate with the U.S. Army Corp of Engineers, (USACOE) – Detroit District regarding the Regional Sediment Management demonstration project and Section 111 efforts in an attempt to realize 100% bypass rates at harbor navigation structures.

I. To restore habitat connectivity and minimize fragmentation of terrestrial and aquatic environments, Michigan should implement statewide land-use goals identified in Michigan's Land, Michigan's Future: Final Report. This effort should include:
   - Initiating local, regional and statewide ecosystem planning efforts that encourage retention of larger natural landscape components, promote establishment of vegetated corridors between landscape fragments, and coordinate management of adjacent public and private lands. Incorporate passage facilities at dams to increase movement of aquatic organisms.
   - Promoting policies and requirements for drainage and channel modification practices that restore stream form, function, and continuity and ensure that aquatic organism passage is maintained.
   - Implementing provisions of the Biological Diversity Act, Part 355 of the Natural Resources and Environmental Protection Act (Act 451, PA 1994), including the requirement for interdepartmental coordination.
   - Address thermal pollution issues to eliminate or minimize fragmentation in aquatic ecosystems.
   - Updating and continuing distribution of Filling the Gaps: Environmental Protection Options for Local Governments to local, regional and statewide planning efforts.

J. Michigan should recognize the need to plan for and monitor impacts of climate change (e.g., the northward migration of species and changes in migration patterns and corridors, alteration of aquatic habitat and the potential value of buffer zones to increase resiliency).

K. Michigan should identify, develop, promote, and implement management techniques (e.g., prescribed burning, pesticides, and water control) to control or eliminate invasive species and deter invasive species establishment and spread. Restoration plans for sites where invasive species have been controlled should be developed.

L. To preserve natural stream structure and function to promote healthy aquatic and terrestrial environments, Michigan should develop and adopt standard culvert design parameters that have proven effective in passing channel-forming flow events and protect the ecological and hydrologic integrity of the stream.

M. To conserve natural communities or locations that provide habitats for rare, threatened or endangered species and rare or unique communities such as dunes and islands that are critical to species restoration programs, Michigan should continue to implement Michigan's Wildlife Action Plan such as:
   - Developing a survey, monitoring and response protocols to identify and address new disease, pathogens and invasive species;
   - Conducting additional surveys to fill knowledge gaps about species distribution and population status. Research is needed to fill knowledge gaps concerning habitat use, potential threats and general life history information. Priority needs for fish include identification of spawning habitat and movement information, while priority needs for mussels and snails include identification of host species.

N. Michigan should accelerate efforts to map the distribution of mussel beds in Michigan in order to provide additional protection to these species, including reviewing and improving procedures to ensure consideration of, and avoidance of, known mussel beds through construction, dredging and other activities; and developing BMPs for mussel rescue and relocation, including post-construction monitoring for survival.

Recommendations Needing Congressional or Federal Agency Action

A. Michigan should work with the Great Lakes congressional delegation to secure funding for the Section 404 wetlands protection program within MDEQ.

B. Michigan should continue to update the NWI in 10-year intervals to monitor long-term wetland trends.

C. Michigan should work with the Great Lakes congressional delegation to ensure that conservation portions of the Farm Bill are maintained in the reauthorization.

D. Michigan should work with the Great Lakes congressional delegation to initiate and support the following actions from the Great Lakes Regional Collaboration Strategy:
   - Provide $20 million additional dollars annually for efforts to promote the protection and restoration of native fish communities in the near shore and open lake waters.
   - Provide $188.7 million annually to achieve the goals of the Great Lakes regions specified in the North American Waterfowl Plan and related joint ventures. Specifically, target $57 million new dollars annually for acquisition, restoration, and other protection tools for wetlands.
   - Pass legislation to authorize a Great Lakes Rivers Act and provide $40 million annually to implement watershed projects that restore hydrol-

ogy, protect and restore riparian habitats for wildlife, restore in-stream habitats needed for fish spawning or nursery sites, and promote access for fish migrations while restricting invasive species expansion.

- Provide $40 million annually to create a coastal shore and upland habitat conservation program to coordinate funding to ensure that Great Lakes native species and communities of greatest conservation need are protected, restored, and appropriately managed. It is further recommended that an increase in funding for existing USFWS landowner incentive program and Partner for Wildlife Program to encourage private and corporate landowners to conserve habitat and help to protect important native species be considered.

E. Michigan should work with the Great Lakes delegation in support of the Great Lakes Commission's Legislative Priorities for FY 2009 that are of importance to Michigan including:
   - Appropriate $16 million to USFWS under the Great Lakes Fish and Wildlife Restoration Act for grants to states, tribes and local governments to encourage cooperative conservation, restoration and management of fish and wildlife resources and habitat.

F. Michigan should work with the Great Lakes congressional delegation in support of the Council of Great Lakes Governors, Great Lakes Restoration and Protection Near Term Action Items For FFY 2009 including:
   - Appropriate $28.5 million to restore 200,000 acres of wetlands, toward the GLRC Strategy's goal of eventual restoration of 550,000 acres. (States, local governments and nongovernmental organizations would raise an additional $28.5 million in nonfederal matching funds.)
   - Continued efforts by the Federal Interagency Task Force to review all federal agencies' wetland management programs and develop a consolidated approach.

Recommendations Needing Michigan Legislative Action

A. Michigan should develop a long-term funding proposal to secure state funding to be used for species and habitat conservation and restoration under existing management plans. Michigan should also encourage federal support of increased funding for species and habitat restoration.

B. Michigan should work with the legislature to secure long-term stable funding to Michigan Conservation Districts in order to adequately deliver restoration programs.

C. Upon the expiration of the current CREP agreement, Michigan should appropriate funds to maximize access to the available federal dollars associated with the program.

D. MDEQ should secure long-term stable funding for wetland, lakes and streams regulatory programs, including monitoring to enable programs to more fully protect Michigan's Great Lakes resources.

E. Michigan should work with the state legislature to develop Transfer of Development Rights legislation to support and encourage regional land-use planning.

F. Michigan should work with the state legislature to develop new regulations/legislation to protect Species of Greatest Conservation Need and vulnerable natural features.

Restoration Recommendations by Watershed/Region

- To be developed after the regional input sessions -

Coastal Health

Background

Potential sources of pathogens impacting recreational water and drinking water in the Great Lakes are the result of both direct and indirect contamination sources. Research has found that primary sources of contamination vary widely by beach and that most sources are local in nature. Sources of concern include:

- Stormwater discharge from nearby outfalls,
- Direct runoff from roads and parking lots,
- Domestic and wild animal waste,
- Malfunctioning septic systems,
- Illegal sewer connections,
- Illegal dumping from marine vessel holding tanks,
- Avian and other animal populations on beaches, and
- Sanitary sewer overflows (SSOs) and combined sewer overflows (CSOs).

Excessive algal growth in the Great Lakes has been a nuisance and a potential source of toxins which had largely disappeared in the late 70's; however, it has now reemerged. Nonpoint source pollution (NPS) and inadequately treated wastes are the major causes of nutrient enrichment of nearshore waters. Both urban and rural NPS are contributing a wide variety of pollutants which are collected by the tributaries and discharged into the Great Lakes, streams and rivers. In addition, the impact of invasive species such as quagga mussels, zebra mussels and round gobies are disrupting the nutrient cycling in the nearshore areas of the lakes.

Success Stories

Beach Monitoring by Local Health Departments - Michigan has 604 public beaches stretching along 545 miles of Great Lakes shoreline. Since 2005, the MDEQ has distributed over $1 million of federal Beaches Environmental Assessment and Coastal Health Act funds to help local health departments monitor 200 high priority beaches. An average of 97 percent of the samples collected each year from monitored beaches indicated that water quality standards for safe swimming are being met. Results from the past five years show that 15 percent of the monitored beaches reported beach closures due to elevated levels of E. coli. While most of Michigan's beaches are extremely clean and water quality is excellent, improvements still need to be made to eliminate pollution sources which can cause closings in some areas. All beaches, their current status (open or closed), and E. coli test results are provided on the MDEQ's Beach Monitoring

Web site which allows interested individuals to automatically receive the latest updates on beach closures and advisories.

When bacterial contamination is found to affect the quality of water at a beach, the MDEQ and local health departments are using a new beach sanitary survey tool to determine sources of the contamination. The beach sanitary survey tool can be used to develop a forecasting model for a beach that can, in turn, be used to predict current water quality conditions. With the ability to forecast the quality of the water at a beach, Michigan can better protect public health.

Mason Township Rapid River Wastewater Improvement Project - Failing septic tanks and contaminated drinking water wells in Masonville Township near Bay de Noc were a documented problem for many decades. The failing septic systems were contributing to increased contamination of private drinking water wells, contamination of the groundwater, and nutrient loading to the surface waters of Bay de Noc. In 2001, Masonville Township received a $1 million Clean Michigan Initiative bond (CMI) Clean Water Fund grant from the MDEQ Non Point Source Program for the Rapid River Wastewater Improvement Project. The Township installed a public wastewater collection system which eliminated 170 failing on-site septic systems. This project resulted in the reduction of 14.8 tons of sediment, 876 pounds of phosphorous, and 2,695 pounds of nitrogen per year. Leveraging available funding from the U.S. Department of Agriculture (USDA) Rural Development and Michigan Economic Development Corporation, the township provided almost $6 million in matching funds to aid in completion of this project in 2007.

Michigan's Coastal Health Goal

Protect public health through the elimination of pollution sources which can cause closings at beaches due to bacterial contamination to enhance recreation opportunities and support a strong and vibrant Michigan economy.

Priority Actions

- To be completed at a later date -

Recommendations for Near-term Actions

A. Michigan should continue to provide financial assistance to local units of government through the State Revolving Fund and the Strategic Quality Initiatives Fund for the construction of infrastructure to eliminate and prevent the discharge of municipal wastewater that impacts the quality of Michigan's coastal waters.

B. Michigan should continue to work with local agencies and encourage the use of beach sanitary surveys to identify unknown pollution sources that cause beach closures.

C. Michigan should continue to investigate the causes and solutions for controlling excessive algal growth that can serve as potential sources of toxins and pathogens, and provide short-term guidance on nuisance algae beach clean up. Of significant importance is the need for research and monitoring to gain a better understanding of the relationship of avian botulism, invasive species, and nutrient levels in nearshore areas and to develop a communication strategy to educate the public about the human health issues.

D. Michigan should partner to develop, evaluate and perform trial runs technologies that provide real-time testing methodologies for assessing bacteriological contamination to manage recreational water.

Recommendations that can be Accomplished within Existing Funding Constraints through Increased Collaboration

It should be noted that Michigan currently has limited funding for the efforts identified below; however, if the Coastal Health goal is to be achieved, continuation of existing programmatic funding is essential.

A. State and local public health agencies should provide public education and/or incentives to reduce impacts from nutrient loading and bather shedding. Michigan should provide information to the public through local signage ordinances and other media at beaches including:
   - Bacteria levels present in natural waters in quantities that may or may not cause a health problem;
   - The risk for illness when there is a beach closure;
   - The risk of feeding waterfowl, which can increase avian waste at beaches;
   - The importance of observing general sanitary practices such as hand washing and staying out of the water when having gastrointestinal illness;
   - The importance of proper boat waste disposal; and
   - The importance of proper pet waste disposal.

B. Michigan should develop a communication strategy focusing on cultural stewardship by involving communities to educate the public about individual actions that can be taken and changes in land use practices that will ultimately benefit coastal health (e.g., Wet Weather days modeled after Ozone action days – Don't wash on a wet day.)

C. Michigan should continue to expand collaborative efforts with local authorities and MDEQ support as necessary, to require corrective action, including necessary enforcement action, to address all identified sources of contamination.

D. Michigan should continue to prioritize the protection of drinking water using existing programs and identify and reduce vulnerability of source water for drinking water through surface water assessments.

E. Michigan should promote research among academia, government, and industry to develop and test methodologies to test for the presence of indicator bacteria and pathogens.
F. Michigan should adopt recommendations from the Michigan Land Use Leadership Council where applicable.

Recommendations Needing Additional Funding to Accomplish

It should be noted that Michigan may have limited funding for some of the efforts identified below; however, if the Coastal Health goal is to be achieved, significant increased funding is essential.

A. Michigan should aggressively pursue implementation of the Phosphorus Advisory Committee's recommendations such as increased public education, research, remediation, and enforcement to prevent indirect pollution sources from adversely impacting Great Lakes coastal health.
B. Michigan should assess the extent of contaminated sediments especially in Areas of Concern (AOCs) that contribute to water quality concerns.
C. Michigan should fully implement, enforce, and report on wet weather control programs (e.g., stormwater, CSOs, SSOs, and NPS) to identify and correct deficiencies to ensure that the requirements of the Federal Clean Water Act are achieved in a timely manner and to eliminate, to the extent provided by existing regulation, the inputs of untreated or inadequately treated human and industrial waste and continue implementation of wet weather programs.
D. Michigan should complete environmental inventories of both emerging pathogens and other pollutants that are comprehensive and include watersheds, wastewater inputs and drinking water withdrawals. From this inventory the sources, fates, and reduction strategies for these items of concern can be evaluated.
E. To better protect drinking water sources, Michigan should fund wellhead protection plans.
F. Michigan should encourage the development of alternative financial mechanisms for local units of government to address stormwater runoff issues by clarifying the process by which local units of government can generate revenue for stormwater control.
G. Michigan should implement a strategy to monitor emerging contaminants such as those on the Michigan Watch List, pharmaceuticals, and personal care products.

Recommendations Needing Congressional and Federal Agency Action

A. Michigan should work with the Great Lakes congressional delegation to insure appropriate and adequate funds are allocated for dredging and infrastructure improvements. The value and importance of maintaining appropriate water depths in Michigan's commercial deep draft and recreational shallow draft harbors, as well as harbor infrastructure maintenance and improvements are critical to providing access to water related

commercial and recreational activities in coastal areas of the state.

B. Michigan should work with the Great Lakes congressional delegation to initiate and support the following actions from Great Lakes Regional Collaboration Strategy:
   - New funding as part of a 55/45 percent federal/local cost share, in federal loans to support state and local resources to fund wastewater treatment improvements.
   - New funding to administer a new loan program to review and upgrade wet weather programs—including the CSO Control Policy, National Pollutant Discharge Elimination System permit issuance and enforcement, and storm water management to ensure that issues are addressed comprehensively and also implement anti-degradation rules in relation to sewage system expansions.

C. Michigan should work with the Great Lakes congressional delegation in support of the Great Lakes Commission's Legislative Priorities for FY 2009 that are of importance to Michigan including:
   - Increase current appropriations for the Beaches Environmental Assessment and Coastal Health (BEACH) Act to $20 million nationwide, including $3.8 million to Great Lakes states. Reauthorize the BEACH Act through 2012 with an increase in the authorized funding level to $40 million and encourage U.S. Environmental Protection Agency (USEPA) to refine its formula for allocating funds under the Act to make it more equitable for states with longer coastlines and larger coastal populations.
   - Reauthorize and fully fund the Coastal Zone Management Act (CZMA) at $120 million nationwide for matching grants to support existing Great Lakes state Coastal Zone Management programs, which protect unique coastal resources, ensure adequate public access to the shore, and encourage coastal-dependent development that conserves natural features and avoids development in hazard areas. Appropriate $60 million nationally for the Coastal and Estuarine Land Conservation Program (CELCP), administered through the CZMA, which provides competitive grants to protect wetlands and other coastal lands of unique value.

D. Michigan should work with the Great Lakes congressional delegation in support of the Council of Great Lakes Governors' Great Lakes Restoration and Protection Near Term Action Items For FFY 2009 including:
   - Ensuring that the federal government, in cooperation with the States, requires that all CSO/SSO communities have completed a long-term control plan within the next four years and are making adequate progress in implementing these plans.
   - Restoring the Fiscal Year 2008 cut of $394.7 million and, in addition, appropriating for Federal Fiscal Year 2009 the historical full-funding of $1.35 billion in support of this program.
   - Providing an additional $2 million under the BEACH Act to enable Great Lakes States and Tribes to standardize and implement a risk-based approach to beach/coastal assessment.
   - Maintaining current funding levels: $1.75 million for the Great Lakes states and $50,000 for eligible tribes.

Recommendations Needing Michigan Legislative Action

A. Pursue enactment of a statewide sanitary code to assure adequate and consistent placement of septic tank tile field systems and standards for minimum requirements for construction, siting, and maintenance of on-site disposal systems. The code should establish requirements for septic tank tile field inspections at the time of sale of the property and require county health departments to establish a regulatory structure to assure consistent statewide regulation of septic tank tile field systems, without pre-empting local control. In the interim, Michigan should support local agencies in the development and implementation of ordinances where septic systems are impacting water quality and instruct homeowners on proper maintenance practices, implementation of alternative treatment technologies and septic system ordinances.

B. To eliminate, to the extent provided by existing regulation, the inputs of untreated or inadequately treated human and industrial waste to the Great Lakes basin waters, Michigan should resume providing General Fund appropriations for the required state match in the State Revolving Fund.

C. Michigan should ensure the sale of Great Lakes Water Quality Bonds at the authorized rate to provide maximum and immediate additional capitalization to the State Revolving Fund, permitting additional funding capacity for assistance to local units of government.

D. Michigan should work with the Michigan legislature to secure long-term funding to improve drinking water infrastructure and support source water protection.

E. Michigan should work with the Michigan legislature to secure long-term funding for Michigan Conservation Districts in order to adequately deliver water source quality protection programming.

F. Michigan should work with the Michigan legislature to secure permanent funding for water quality and bacteriological monitoring.

Restoration Recommendations by Watershed/Region

- To be developed after the regional input sessions -

Areas of Concern/Sediments

Background

In 1987, amendments to the United States/Canada Great Lakes Water Quality Agreement (GLWQA) were adopted by the federal governments of the United States and Canada. Annex 2 of the amendments listed 14 different beneficial use impairments (BUI) which are caused by a detrimental change in the chemical, physical, or biological integrity of the Great Lakes system. It directed the two countries to identify Areas of Concern (AOCs) that did not meet the objectives of the GLWQA. Remedial Action Plans (RAPs) addressing the BUIs were to be prepared for all AOCs. The BUIs provided a tool for describing effects of the contamination and a means for focusing remedial actions.

The scope of the AOC program is based on the concept that each area has had at least one BUI that is an extraordinary problem; one that sets the area apart from other sites with contamination in the state that are not designated as an AOC.

There are 14 AOCs in Michigan, with a total of 110 BUIs (see Table 1 and Figure 1.) Ten of the AOCs are completely within Michigan's borders (Kalamazoo River, Muskegon Lake, White Lake, Manistique River, Deer Lake, Torch Lake, Saginaw River/Bay, River Raisin, Rouge River, and Clinton River). Three (Detroit, St. Clair and St. Marys Rivers) are along the U.S. and Canadian border, and one AOC, Menominee River, is shared with Wisconsin. In the latter four AOCs, responsibility for restoring BUIs is shared among jurisdictions.

Public involvement is a key component of the AOC program in Michigan. Each AOC has had significant input from a Public Advisory Committee, and the program has a Statewide Public Advisory Council consisting of members of individual councils. All are integral to the program.

AOCs vary widely in geographic scope and extent of environmental problems. Some are confined to small harbors and others encompass an entire river watershed. Some are impacted primarily by one large contaminated sediment site and others face multiple sources of pollution and extensive loss of habitat. The most common sources of impairments are contaminated sediments, sewage treatment plant discharges and CSOs, NPS; runoff from hazardous waste sites, and habitat degradation and destruction.

Contaminated sediments are linked to impairments in all 31 United States AOCs, including all 14 Michigan AOCs. Many sediment dredging projects are constrained by the complexity and cost of design and implementation, limited alternatives to contaminated sediment dredging and disposal, limited disposal capacity, and challenges for beneficial re-use of some sediments.

Full restoration of the Great Lakes AOC would contribute significantly toward the overall goal of Great Lakes restoration and lead to benefits estimated at up to $50 billion for the region. Progress on restoration of Michigan's AOCs is tracked by removal of BUIs. Details for BUIs in each AOC can be found at http://www.epa.gov/glnpo/aoc/index.html.

Table 1: Michigan AOC-BUI Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total
Clinton River	X				X	X	X		X	X			X	X	8
Deer Lake	X			X			X								3
Detroit River	X	X	X	X	X	X		X	X	X			X	X	11
Kalamazoo River	X			X	X	X			X	X			X	X	8
Manistique River	X				R	X			X					X	5
Menominee River	X				X	X			X				X	X	6
Muskegon River	X				X	X	X	X	X	X			X	X	9
River Raisin	X			X	X	X	X		X	X			X	X	9
Rouge River	X		X		X	X	X		X	X			X	X	9
Saginaw Bay/River	X	X		X	X	X	X	X	X	X		X	X	X	12
St. Clair River	X	X		X	X	X		X	X	X	X			X	10
St. Marys River	X		X	X	X	X	X		X	X			X	X	10
Torch Lake	X		R		X										3
White Lake	X				X	X	X	X		X			X	X	8

1 = Restrictions on fish and wildlife consumption
2 = Tainting of fish and wildlife flavor
3 = Fish tumors or other deformities
4 = Bird or animal deformities or reproductive problems
5 = Degradation of benthos
6 = Restrictions on dredging activities
7 = Eutrophication or undesirable algae
8 = Restrictions on drinking water consumption or taste and odor problems
9 = Beach closings
10 = Degradation of aesthetics
11 = Added costs to agriculture or industry
12 = Degradation of phyto- or zooplankton populations
13 = Degradation of fish and wildlife populations
14 = Loss of fish and wildlife habitat
R= Removed

20 Years of Progress towards Delisting Michigan's Great Lakes AOCs - 2007 marked the 20th anniversary of the Amendments to the GLWQA that established the Great Lakes AOC program. To restore the BUI in the AOCs, RAPs were developed and have been implemented. Significant progress has been made in that restoration effort. As restoration goes forward in the AOCs, the MDEQ is documenting that work. Michigan recently finalized guidance for formal removal of BUIs that have been restored and for delisting AOCs from which all BUIs have been removed. Three BUIs have already been removed and several others are under assessment for removal in Michigan's AOCs. Local public advisory councils and a Statewide Public Advisory Council are integral to the work by providing input and support necessary to make the investments in restoration.

Making Progress by Removing Contaminated Sediment in Great Lakes AOC - In 1998, the citizens of Michigan made the quality of our environment a priority by passing the Clean Michigan Initiative (CMI) bond. As part of the CMI bond initiative, $25 million was set aside for the investigation and remediation of contaminated sediments in Michigan lakes, rivers, and streams. In 2002, Congress passed the Great Lakes Legacy Act (Legacy Act) which provides funding for the clean-up of contaminated sediment in AOCs within the United States. By combining the CMI funding with the Legacy Act funding, Michigan has made great strides towards the remediation of contaminated sediments. These projects have been in addition to the important Superfund work completed or in progress in Michigan's AOCs. Projects recently completed include:

Detroit River AOC - In 2004, the MDEQ signed the first Legacy Act Project agreement with the USEPA for the remediation of sediments in the Black Lagoon, Trenton Channel, located in the Detroit River AOC. This project resulted in the removal of approximately 115,000 cubic yards of sediment contaminated with mercury, polychlorinated biphenyl, and oil and grease. In 2007, the Black Lagoon was renamed Ellias Cove and will be the future site of a marina. Without this project, the economic redevelopment in this portion of the Detroit River would not have been possible.

Muskegon Lake AOC – In 2006, the Ruddiman Creek project was completed with CMI bond monies and Legacy Act funds. This project resulted in the removal of approximately 95,000 cubic yards of sediments contaminated with cadmium, chromium, lead, and organic chemicals.

St. Marys River AOC - The Cannelton Industries, Inc. site, resulted from tannery operations between 1900 and 1958, which left contaminated sediments. Under an innovative cost-share agreement, the MDEQ, using CMI bond monies, worked with the USEPA and a private party to remove contaminated sediments from the St. Marys River. As a result of this action, the USEPA, in coordination with the MDEQ, is now preparing to delete the site from the National Priorities List. The City of Sault Ste. Marie is interested in redeveloping the upland portions of the site for municipal purposes and zoning the shoreline for residential and recreational purposes.

Kalamazoo River AOC - USEPA and MDEQ are overseeing work in the Kalamazoo River on sediments contaminated due to historic releases of polychlorinated biphenyls (PCBs), which originated primarily from de-inking operations at local paper mills. The estimated cost of the removal action is $30 million.

Michigan's AOC/Sediments Restoration and Protection Goal

Restore and protect beneficial uses in 14 Michigan AOCs where human activities have caused or are likely to cause impairment of beneficial human uses or the area's ability to support aquatic life and to serve as an important step toward virtual elimination of persistent toxic substances within the Great Lakes.

Priority Actions

- To be determined at a later date -

Near Term Actions

- To be determined at a later date through the prioritization process -

Recommendations that Can Be Accomplished within Existing Funding Constraints through Increased Collaboration

It should be noted that Michigan currently has limited funding for the efforts identified below; however, if the Michigan's AOC/Sediments Restoration and Protection goal is to be achieved, continuation of existing programmatic funding is essential.

A. Michigan should continue to participate in the Federal-State AOC Coordinating Committee to better coordinate efforts, optimize existing programs and authorities, and provide a state advocacy role to advance restoration of the AOCs.
B. Michigan, collaboratively with federal, state, local, and tribal partners, should develop delisting targets for each Michigan AOC collaboratively by federal, state, local, and tribal partners.
C. Michigan should track BUI removal priorities and actions to document progress in restoring the AOCs.
D. Michigan should request a proportional share, relative to the number of AOCs, of any increased federal funding for AOC program implementation.
E. Michigan should coordinate closely with the U.S. Army Corp of Engineers (USACOE) Great Lakes RAP Program and habitat restoration initiatives to request funding for projects that advance restoration of the AOCs.
F. Michigan should coordinate closely with the National Oceanic Atmospheric Administration (NOAA) habitat restoration initiatives to request

funding for projects that advance restoration of the AOCs.

G. Michigan should allocate available federal funding to ensure that delisting criteria for the AOCs in the state are completed by the end of 2008.
H. Michigan should collaborate with USEPA, the USACOE and the tribes to examine innovative approaches to the ultimate disposition of contaminated sediments as an alternative to the current practice of disposing of them in Confined Disposal Facilities (CDFs) or landfills.
I. Michigan Department of Natural Resources (MDNR) should continue to partner with the U.S. Fish and Wildlife Service (USFWS) habitat restoration programs to optimize implementation in AOCs.

Recommendations needing additional funding to accomplish

It should be noted that Michigan may have limited funding for some of the efforts identified below; however, if the NPS goal is to be achieved, significant new resources will be essential.

A. Michigan should strive to delist three AOCs (restored to target goals) by the end of 2010.
B. Michigan should strive to remediate all currently known contaminated sediment sites in the AOCs by 2020. This, coupled with restoration measures, will facilitate complete restoration of the AOCs.
C. Michigan needs to continue to make available state match for federal funding sources to optimize use of available resources. This includes working with federal sources to make rules for matching funds more flexible and transparent.
D. Habitat restoration in urban areas should be supported at the state level.

Recommendations Needing Congressional of Federal Agency Action

A. Michigan should support full appropriations for the Great Lakes Legacy Act.
B. Congress should support federal funding, at $3 million annually over the next five years, for the research and development program authorized in Section 306 of the Legacy Act. This research will test and promote viable treatment technologies that allow for the separation, immobilization, neutralization, or destruction of contaminants in sediments; in-situ or after removal. A significant focus of this work should be on the development of technologies that produce no new contaminants and do not release contaminants to the environment.
C. Michigan should work with the Great Lakes congressional delegation to initiate and support the recommendations from the Great Lakes Regional Collaboration Strategy on amendments to the Legacy Act to allow for more efficient implementation of the program, as follows:
    - The "maintenance of effort" language in the Legacy Act should be dropped because it is not appropriate in the context of sediment remediation where costs often vary widely from year to year and, as a result, can lead to inadvertent disqualification of otherwise eligible and valuable

projects.

- The life of appropriated Legacy Act funds should be extended beyond two years (as envisioned by the Legacy Act) to accommodate both responsible remediation and long-term monitoring of the effectiveness of implemented remedies, which is consistent with the 2002 Great Lakes Strategy.
- The current 35 percent level of matching funds/in-kind services required under the Legacy Act from the nonfederal sponsor at "orphan sites" should be adjusted to 25 percent, or at a minimum, Legacy Act funds should be available for planning and design work with no match or reduced match, in order to "tee-up" projects and maintain momentum.
- The current limitation in the Legacy Act which requires exclusive federal agency project implementation precludes disbursal of funds to other entities to assume the lead in project implementation. This requirement restricts the efficient implementation of remedial work in some cases, and should be amended to allow direct disbursal of project funds, which would allow for greater flexibility in implementing the program.

D. Michigan should work with the Great Lakes congressional delegation in support of the Great Lakes Commission's Legislative Priorities for FY 2009 that are of importance to Michigan including:

- Fully fund the Act to remediate contaminated sediments in AOCs. The Great Lakes Act is vital for cleaning up Great Lakes "toxic hot spots."
- Appropriate $10 million to USEPA for distribution to the Great Lakes states and local advisory committees in the 30 USAOCs to support development and implementation of RAPs.
- Appropriate $1.7 million to USEPA's GLNPO for program administration.
- Appropriate $3 million to USACOE for the Great Lakes Remedial Action Program to provide technical analyses and related support.
- Appropriate $2 million for NOAA's Great Lakes Habitat Restoration Program to restore fish and wildlife resources in the AOCs.

Recommendations Needing Michigan Legislative Action

A. Michigan state agencies should work with the Michigan legislature to secure long-term funding for sediment cleanups to use the Legacy Act to the maximum extent possible to enhance and accelerate the pace of sediment remediation in the AOCs. By making available $100 million in state funds as a match to federal funds oversight and sediment cleanup related activities could be completed on the Rouge River, River Raisin, Detroit River, and Muskegon Lake AOC.

Restoration Recommendations by Watershed/Region

- To be completed after local public meetings -

Nonpoint Source

Background

Pollutants that originate from diffuse sources such as fields and parking lots remain among the most significant problems threatening the water quality of Michigan's lakes, streams, wetlands, and groundwater. These nonpoint source (NPS) pollutants include excessive nutrients, contaminants, microorganisms, sedimentation, and altered flow regimes. These stressors affect Michigan waters through three primary pathways: surface runoff, groundwater infiltration, and atmospheric deposition. The pervasive nature of the problem is widely recognized, although often not well understood.

NPS impacts vary greatly in frequency and severity, affecting plants, wildlife and fish, threatening human health, reducing recreational opportunities, increasing the cost of treating drinking water and dredging our harbors and marinas. Actions to reduce or remove stressors have direct short-term costs, but often save money in the long-term.

To ensure effectiveness, the tools and strategies to address NPS pollution must be coordinated among partner agencies and organizations, and must be geographically targeted. In addition, effective reduction of NPS pollution will also include integrating control strategies with local land use and smart growth initiatives.

Numerous organizations and groups throughout Michigan are taking action to reduce NPS pollution in the Great Lakes basin. The combination of federal, state, tribal, and local institutions and programs that are already actively involved in reducing NPS pollution has resulted in many successful efforts. Despite the significant progress that has been made, results from a survey conducted by the MDEQ in 2004 identified over $500 million of unmet funding needs for NPS projects where watershed management plans have been completed.

Michigan's efforts should proactively reduce and prevent NPS pollution and encourage stewardship of the Great Lakes through efforts such as:

- Using a watershed approach,
- Enhancing the watershed approach by addressing forestry, recreation, resource extraction, and transportation-related NPS,
- Support, promote, and facilitate sustainable land use practices and planning,
- Engage local partnerships, and
- Develop NPS tools such as financial and technical assistance, information and education, and regulatory actions.

The Clean Michigan Initiative (CMI) approved by voters in 1998, authorized $50 million in bonds for NPS prevention and watershed protection proj-

ects. To date, MDEQ has awarded available bonds to local units of government and watershed groups for implementation efforts that have resulted in:

- 646 acres of wetlands being created or restored,
- 9,757 linear feet of stream channels being restored,
- 53,215 linear feet of stream bank stabilized,
- 2,479 acres of permanent easements secured,
- 998 acres of conservation tillage practices being installed,
- 118,548 linear feet of buffer strips being installed.

The CMI has also supported the Conservation Reserve Enhancement Program (CREP), a voluntary program that uses environmentally sound conservation practices on agricultural lands to improve water quality, prevent soil erosion, and enhance wildlife habitat. For each dollar the state invests in CREP, the United States Department of Agriculture (USDA) contributes at least four dollars. To date, Michigan has successfully leveraged $125 million federal dollars through CREP; however, the CMI CREP funding will soon be exhausted.

Success Stories

Michigan's Conservation Reserve Enhancement Program - Michigan's CREP was created to help protect our environment and wildlife by encouraging farmers to adopt conservation practices. The Michigan Department of Agriculture (MDA), Department of Natural Resources (MDNR) and MDEQ and private partners such as Ducks Unlimited, Pheasants Forever, the Michigan Chapter of the Nature Conservancy and the Joyce Foundation, are partnering with the federal government to implement conservation practices. CREP has been highly successful in protecting Michigan's valuable resources and sustaining its agriculture enterprise. Since CREP began seven years ago, it has been responsible for 35,000 acres of vegetated filter strips; 16,000 acres of wetland restoration practices; 11,000 acres of re-vegetated cropland potentially vulnerable to erosion; and 1,700 acres of windbreaks in Michigan. The response by wildlife to these restored ecosystems has been tremendous. Wildlife species benefiting from CREP practices include songbirds, pheasants, waterfowl, and wild turkey. The MDNR Pheasant Brood survey in the thumb region has found 55% of the broods are in or adjacent to CREP lands. Waterfowl surveys conducted by the MDNR in the River Raisin have shown CREP areas have a stable or increasing population, while areas outside of CREP are declining. Michigan Natural Features Inventory (MNFI) and MDNR staff have also observed threatened and endangered species such as Henslow sparrows, Grasshopper sparrows, and Northern Harriers on CREP lands.

Whetstone Brook Restoration – This Upper Peninsula NPS project resulted in restoration and permanent protection for Whetstone Brook. For over 130 years, Whetstone Brook had been confined to a culvert under the south railroad yards adjacent to the City of Marquette downtown business district. With a CMI NPS grant, the City was able to remove the culvert and restore this section of trout stream to its original condition. To ensure this restoration

effort remains, the City established permanent vegetative buffers on both sides of the stream. The vegetation will filter and clean area storm water runoff before entering the brook and provide habitat for plants, animals and fish.

Michigan's Nonpoint Source Goal

To control or eliminate NPS pollution in Michigan to provide for healthy and diverse aquatic ecosystems, protect public health, restore natural hydrology to streams, enhance environmentally compatible recreation opportunities and support a strong and vibrant Michigan economy.

Priority Actions

- To be completed at a later date -

Near Term Actions

- To be completed at a later date -

Recommendations that can be Accomplished within Existing Funding Constraints through Increased Collaboration

It should be noted that Michigan currently has limited funding for the efforts identified below; however, if the NPS goal is to be achieved, continuation of existing programmatic funding is essential.

A. Michigan should continue to encourage the development and implementation of ordinances and the use of permanent conservation easements to prevent NPS pollution. Michigan intends to accomplish this through support to local agencies in the development and implementation of ordinances that protect water quality, including stormwater, land use development, septic system, riparian buffer, lawn fertilizers and promotion of permanent conservation easements.
B. Where residues from registered pesticides continue to be detected at or below trigger levels in Michigan surface waters, Michigan should continue to support efforts that provide sufficient delineation of watersheds where these loadings continue to be a problem, and as these areas of concern are detected, MDA should be directed to address these loadings using available regulatory controls.
C. When alteration of stream channels is necessary, Michigan should promote the use of natural channel design.
D. Michigan should encourage research on upland land practices and other NPS controls that can be measured to determine what kinds of improvements result in supporting healthy systems (e.g., optimal habitat for species, drinking water, etc).

E. Michigan should evaluate management practices to measure and determine the effectiveness in achieving the desired results of these practices.

F. With recent passage of the Farm Bill, Michigan should work with the USDA Natural Resources Conservation Service to provide full support of state and local agencies to make sure Michigan receives maximum benefit of the programs authorized. These programs include the Conservation Reserve Program, the Conservation Security Program, EQIP and the Wetland Restoration Program. Michigan should work cooperatively with USDA to leverage Federal Farm Bill funding in all potential programs.

Recommendations Needing Additional Funding to Accomplish

It should be noted that Michigan may have limited funding for some of the efforts identified below; however, if the NPS goal is to be achieved, significant new resources will be essential.

A. Michigan should encourage the use of watershed management plans or similar tools to target NPS reduction activities to the highest priority places based on meeting specific restoration and/or protection goals. This effort should include enforcement of existing regulations, technical assistance to stakeholders, education and outreach, grants to develop and implement watershed management plans, partnerships with stakeholders and monitoring the effectiveness of these activities.

B. Michigan should reduce agricultural NPS pollutants and flow regime alterations in priority agricultural watersheds. This effort should include implementation of practices such as: filter strips, cover crops, tile line management, no-till, manure/nutrient management, wetland restoration, etc. This would be accomplished by expanding CREP into additional agricultural watersheds, further promoting and implementing the Michigan Agriculture Environmental Assurance Program (MAEAP) and by targeting state dollars toward local Conservation District technical staff to work with landowners.

C. Michigan should ensure that livestock operations are not a source of environmental impairment through Comprehensive Nutrient Management Plan (CNMP) implementation and enforcement, when needed. Michigan should also encourage the use of watershed management plans or similar tools to target nutrient reduction activities at high priority locations based on meeting specific restoration and/or protection goals.

D. Michigan should improve flow regimes in watersheds affected by hydrologic alterations and reduce stormwater runoff impact in priority urban watersheds through continuation of the stormwater permitting program in qualifying areas and through the development and implementation of watershed management plans. In addition, Michigan should continue to provide technical assistance, education and outreach, and grants to encourage low impact development practices and other stormwater control and management techniques.

E. Michigan should restore impaired waters through efforts such as:

- Developing and submitting to the USEPA up to 50 Total Maximum Daily Load (TMDL).
- Focusing NPS control activities on impaired waters and document projects that resulted in water quality improvements or restoration of ecological functions.

- By 2012, attaining water quality standards for all pollutants and impairments in 10 waterbodies listed on Michigan's nonattainment list.
- By 2012, restoring at least 20 specific causes of water body impairment included on the state's nonattainment list.
- By 2012, measurably improving water quality conditions in at least five watersheds.

F. Michigan should increase funding to local conservation districts and watershed groups for NPS programming.

Recommendations Needing Congressional or Federal Agency Action

A. Michigan should work with the Great Lakes congressional delegation to pursue modifications to CREP to increase the time commitment for keeping specified land out of production and assuring that critical areas near highly vulnerable waters stay out of production permanently.

B. Michigan should work with the Great Lakes congressional delegation to initiate and support the following actions from the Great Lakes Strategy and Council of Great Lakes Governors Priorities:
   - New funding for the installation of buffer strips in urban and suburban areas. A new revenue source is needed for municipalities under stormwater permits to install buffer strips in urban and suburban areas. Also needed is a new local revenue such as a user fee system that would allow municipalities access to the State Revolving Loan Fund (SRF) for stormwater related projects is needed.
   - Additional funding for conservation tillage through the federal Environmental Quality Incentives Program (EQIP) to reduce pollutants in impaired waters or to protect high quality waters in Michigan. Critical areas in Michigan for this funding are Saginaw Bay, Lake St. Clair, nearshore waters of Lake Michigan and Michigan's Areas of Concern (AOCs).
   - New funding in the amount of $18 million to improve ten urban watersheds to address hydrologic impacts focusing on reducing pollutant loadings through installation of best management practices (BMPs).
   - New funding to develop and implement CNMPs on livestock farms. This would include funding for educational materials, development grants and technical assistance through the USDA Natural Resource Conservation Service.

C. Michigan should work with the Great Lakes congressional delegation in support of the Great Lakes Commission's Legislative Priorities for FY 2009 that are of Importance to Michigan including:
   - Reauthorize and fully fund the Great Lakes Basin Program for Soil Erosion and Sediment Control to maintain the current authorized level ($5 million) and tie the program to the priorities of the GLRC.
   - Appropriate $66 million to USDA to increase enrollment in buffer strip programs for water quality improvement in Great Lakes tributaries.
   - Increase appropriations to USEPA for the Section 319 Program, including $82M to the Great Lakes states, to implement NPS pollution controls that are critical to improving water quality.

Recommendations Needing Michigan Legislative Action

A. Pursue enactment of a statewide sanitary code to assure adequate and consistent placement of septic tank tile field systems. The code should establish requirements for septic tank tile field inspections at the time of sale of the property and require county health departments to establish a structure to assure consistent statewide regulation of septic tank tile field systems, without preempting local control. In the interim, Michigan should support local agencies in the development and implementation of septic ordinances, where septic systems are impacting water quality, and instruct homeowners on proper maintenance practices, implementation of alternative treatment technologies and the development of septic system ordinances.

B. Pursue enactment of legislation to reduce phosphorus loadings to the environment from:
   - Over-application and misapplication of phosphorus containing fertilizers to residential lawns.
   - Phosphorus-containing automatic dishwasher detergent and laundry boosters.

C. Michigan state agencies should work with the Michigan legislature to secure long-term funding for NPS pollution prevention (P2) and control activities such as:
   - NPS watershed management plan development and implementation,
   - CREP, Conservation Technical Assistance Initiative and MAEAP, and
   - Grants to establish conservation easements in support of farmland preservation and of open space preservation for protection of water quality and ecologically sensitive areas.

D. Michigan should support legislation clarifying the process by which local communities can generate revenue for stormwater control and consider development of a statewide stormwater act.

Restoration Recommendations by Watershed/Region

- To be completed after local public meetings -

Toxic Pollutants

Background

While certain persistent toxic substances (PTS) have been significantly reduced in the Great Lakes Basin ecosystem over the past 30 years, some continue to be present at levels that potentially pose threats to human and wildlife health, warrant fish consumption advisories in all five lakes, and disrupt a way of life for many in the basin, particularly the life ways and culture of tribal communities.

Toxic substances are those substances which can cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological or reproductive malfunctions or physical deformities in any organism or its offspring, or which can become poisonous after concentration in the food chain or in combination with other substances. This toxic pollutant framework includes persistent, bioaccumulative toxic pollutants and other toxic pollutants that also can pose a risk to humans and wildlife because they are persistently released to water bodies and may cause stress to organisms by their presence and exposure in water. Substances that are persistent do not easily break down in the environment and are resistant to natural degradation processes. Bioaccumulation refers to the potential for a substance to be stored in tissue. Exposure to pollutants that are toxic potentially could result in any of the symptoms described above. Substances that are persistent, bioaccumulative and toxic are often referred to as PBTs.

Toxic substance releases originate from contaminated bottom sediments, various industrial processes, NPS, atmospheric deposition, contaminated groundwater, and continuous cycling of toxic substances within the Great Lakes themselves, all contributing to this ongoing problem. More recently, researchers have documented the presence of additional chemicals of emerging concern that may also pose threats to the Great Lakes. The characteristics of these substances including their sources, releases, fate, transport, persistence, bioaccumulation, and toxicity must be better understood. While there is concern for toxic substances released into the Great Lakes, efforts need to be focused on actions that will address historic deposition of these substances which persist and recycle throughout the environment, as well as to pursue elimination of on-going and new releases.

Success Stories

Clean Michigan Initiative Bond - Michigan has invested millions of dollars to reduce and prevent the introduction of PBTs into the Great Lakes ecosystem through programs targeting the reduction of releases and elimination of original sources of mercury, dioxins, pesticides, and other toxic substances that pose threats to human and wildlife health. In 1998, Michigan voters approved a $675 million bond initiative, the Clean Michigan Initiative (CMI), to improve and protect Michigan's water resources. In order to continue the CMI program which has made significant advances in improvements and protection of Michigan's water resources, and to revitalize our state, additional long term funding is needed.

Declines of PBTs in Fish –The State of Michigan and/or federal agencies have regularly monitored contaminant concentrations in fish collected from the Great Lakes for over 30 years. Total Polychlorinated biphenyls (PCB) and total Dichloro-Diphenyl-Trichloroethane (DDT) concentrations in lake trout from Lakes Superior, Michigan, Huron, and Ontario have declined significantly since the early 1970s, although the rate of decline has slowed since the mid-1980s. Concentrations of PCB and DDT have gradually declined in Lake Erie walleye since the mid-1970s as well. Since the early 1990s, PCB and DDT concentrations in fish from the Great Lakes and connecting channels have declined by approximately 7 percent per year.

In addition, the MDEQ has been regularly monitoring dioxin concentrations in lake trout from Lake Superior (Keweenaw Bay), Lake Huron (Thunder Bay), and Lake Michigan (Grand Traverse Bay), and in carp from Saginaw Bay. Dioxin concentrations in the Lake Superior and Lake Huron samples have declined an average of 5 percent per year since the early 1990s; no change has been detected in the Lake Michigan samples.

The MDEQ has been monitoring contaminant levels in fish from 12 fixed station river impoundment and inland lake trend sites since the early 1990's. Analysis of the data has shown a consistent decline in concentrations of PCBs, DDT, and chlordane. Total PCBs and total DDT have each declined an average of 8 percent per year, and total chlordane has declined an average of 9 percent per year over that time period.

Superior Watershed Partnership (SWP) – This 501 (c) (3) non-profit organization serves the entire Upper Peninsula (15 counties) including portions of the Lake Superior, Lake Michigan and Lake Huron watersheds. The SWP has over 15 citizen-based watershed advisory councils. The SWP implements on-the-ground watershed restoration projects including but not limited to: stream crossing replacements (bridges, culverts), large scale erosion control, dam removals, stream restoration, stormwater management, native species re-introduction, invasive species removal, public access improvements, coastal management, forestry BMP's, agriculture BMP's, etc. The SWP coordinates and funds the Earth Keepers initiative, a unique coalition of faith communities in Michigan's Upper Peninsula that is taking action to protect public health and the environment (for more information go to: http://wwwsuperior-watersheds.org/projects.php?id=5. Via U.S. Environmental Protection Agency (USEPA) funding, state, local, and tribal partners, the Superior Watershed Partnership through its Earth Keepers partners have achieved unprecedented success with annual "Clean Sweep" multi-site one-day (Earth Day) collection events. In 2005 and 2006, Earth Keepers collected and recycled 45.7 tons of household hazardous waste and over 300 tons of electronic waste.

In addition, in 2007 over a ton of pharmaceutical waste collected including an estimated $500,000 in narcotics. The SWP also coordinates other community-based P2 efforts including working with the Keweenaw Bay Indian Community to implement mercury thermometer exchange and fluorescent light bulb disposal programs for tribal members, working with the Superior District Dental Society to install mercury amalgam separators in over 30 dentist offices in Marquette and Alger counties to prevent mercury from entering local waterways, and a public education campaign on burn barrel use for trash disposal including assisting local units of government with development of zoning ordinances.

Pesticide Clean-Sweep - From FY 1995 through Fiscal Year 2007 the Michigan Department of Agriculture's (MDA) Clean Sweep pesticide collection

program has paid for the proper disposal of approximately 1,450,000 lbs of pesticides. In 2005 the program started to record individual pesticides collected using a custom database. The process allows the state to determine active ingredients collected by the program, based on pesticide formulation information maintained by USEPA. Michigan is one of the few states in the country that can provide this level of detail. In FY 2007 the program collected and disposed of over 142,000 pounds of pesticides. Included in this total was more than 810 pounds of chlordane, 690 pounds of arsenic-containing pesticides, and over 480 pounds of DDT. More than one-third of the submissions, by formulated weight, were unknown pesticides. These are primarily products that have been re packaged at some point, and/or have no labels or registration numbers. The proper disposal of almost 52,000 pounds of unknown pesticides represents a substantial reduction in risk to Michigan's population and the environment.

Dairy Manometers - A Michigan dairy farm mercury manometer exchange program was piloted in 1998 and expanded statewide in 2000. Manometers are used to measure the suction pressure on the dairy milking machinery. The exchange program was co-sponsored by the MDA and the MDEQ. It offered dairy farmers up to $250 credit toward the cost of replacing mercury manometers with mercury-free vacuum gauges. In all, the project replaced 131 mercury manometers and collected 158 pounds of liquid elemental mercury.

Michigan Schools - A significant effort in Michigan has been made to eliminate mercury in schools as required by PA 376 of 2000 which required mercury elimination in K-12 schools by 2004. Letters and CDs with elimination guidelines were sent to all Michigan schools, various workshops were held and follow-up surveys and guidance were provided in 2005 by MDEQ, Michigan Department of Community Health (MDCH) and Michigan Department of Education. Working with USEPA, MDEQ also successfully removed 1,823 mercury-containing items, 293 pounds of mercury compounds and 971 of elemental mercury in Michigan schools from 2004-2006 (for more information go to www.michigan.gov/mercury and www.michigan.gov/deq).

Michigan Toxic Substances Goal

Michigan concurs with the Great Lakes Regional Collaboration (GLRC) Strategy to adopt a long-term goal of virtually eliminating the release of, and exposure, to PBTs and other toxic substances into the Great Lakes Basin ecosystem to protect human health, fisheries and wildlife populations and the aquatic environment. The goal of elimination will be sought within the most expedient time frame, through the most appropriate common sense, practical and cost-effective mix of voluntary, regulatory, and incentive-based actions. Michigan recognizes that complete removal may not be practical from open waters, bottom sediments, or landfill leachate for some PTS. Therefore, Michigan qualifies elimination of PTS from the ecosystem to concentrations that will be protective of public health and the environment.

Priority Actions

- To be completed at a later date -

Near Term Actions

A. MDEQ should develop rules and complete the rule promulgation process to control mercury emissions from coal-fired electric generating units 90 percent by 2015 as directed by Governor Jennifer M. Granholm's April 17, 2006, letter to MDEQ Director Chester.
B. MDEQ should take delegation of USEPA's area source rules for electric arc furnaces and steel foundries to obtain further mercury emission reductions from mercury-containing automobile switches.

Recommendations that Can be Accomplished within Existing Funding Constraints through Increased Collaboration

It should be noted that Michigan currently has limited funding for the efforts identified below; however, if the Toxic Pollutants goal is to be achieved, continuation of existing programmatic funding is essential.

A. Michigan should continue to address on-going releases from historically contaminated environmental media through source control and other remedial methods to attempt to virtually eliminate the release of toxic substances by eliminating the principal sources of mercury, PCBs, dioxins and furans, pesticides and other toxic substances that threaten the health of the Great Lakes basin ecosystem. For example,
   - MDEQ should continue to implement cleanup requirements that include emphasis on source removal and source control, including reservoir sources of toxic substances in contaminated soils and sediments;
   - MDEQ should continue to implement cleanup requirements for contaminated groundwater venting to surface waters as established by statute and rule to assure compliance with the GLWQA and Great Lakes Toxic Substance Control Agreement;
   - MDEQ should evaluate and revise, if appropriate, cleanup criteria to incorporate knowledge gained through research and studies in the areas of contaminant fate and transport and risk assessment;
   - MDEQ should continue to implement requirements for parties to supply the necessary data for development of criteria for emerging contaminants; and
   - Michigan should use successful remediation projects in Michigan as models to follow to further address the clean-up of other sites contaminated with toxic substances.
B. Michigan should continue regional, national, and international efforts that address long-range transport and deposition of PBTs.
C. Michigan should implement the MDEQ's Mercury Strategy Staff Report as revised, August 2008, focusing on the top ten priority recommendations including:
   - Continue to implement activities that phase out mercury-added products where viable alternatives exist. Adopt additional mercury product phase outs and adopt laws that follow the Northeast Waste Management Officials Association's Model Legislation.

- Utilize the USEPA "5m" approach under the Clean Water Act to satisfy appropriate mercury total maximum daily load (TMDL) development requirements, using the MDEQ Mercury Strategy as a tool for implementation to address waters impaired by atmospheric deposition.
- Michigan should implement the GLRC's Mercury Products Phase-Down Strategy and the GLRC's Mercury Emissions Reduction Initiative to complete phase-outs of mercury uses, including, as practical, a mercury waste management component and to address unregulated sources of mercury emissions.

D. Michigan should continue to participate in the national Quicksilver Caucus to better coordinate national and international mercury reduction efforts, as well as, to develop a national and international mercury collection program with an associated sequestering infrastructure

E. To reduce airborne sources of dioxins and furans to the Great Lakes, Michigan should continue to support activities to address deficiencies in Michigan's household hazardous waste collection infrastructure for household waste collection and agricultural plastic waste burning and support enforcement efforts to stop illegal burning. In addition, Michigan should implement outreach plans with local governments and Health Departments on human health risks regarding exposure to dioxins and furans.

F. Michigan, the MDEQ and the MDCH, should continue activities to ensure that the risks of exposure to dioxins and furans within the Saginaw Bay watershed specifically the Tittabawassee River south of Midland, the Saginaw River, and Saginaw Bay are adequately mitigated.

G. To eliminate the release of PCBs into the Great Lakes basin ecosystem, Michigan should collaborate with utilities and other stakeholders to voluntarily phase out PCB containing capacitors. In addition, Michigan should be consistent with the Stockholm Convention on Persistent Organic Pollutants, by decommissioning and properly disposing of electrical equipment containing PCBs.

H. A consistent set of messages from agencies and local health and environmental agencies is needed to protect the public from health effects of PTS exposure and to provide the public with lifestyle choices to reduce PTS uses and releases to the Great Lakes. Michigan should protect human health, fish and wildlife populations, and the aquatic environment from toxic substances by preventing the exposure to PTS through effective outreach and education, including:
   - Conducting education and outreach activities on proper use and disposal of mercury-added products to prevent exposure, developing brochures and training documents to address the burning of household trash and agricultural plastic wastes, and increasing education and incentives for replacing old wood burning stoves.
   - Michigan should develop and implement an education and outreach campaign in coordination with existing messages and stakeholder groups that focuses on habits of at risk individuals, households, the workplace, and schools to help the public do its part to reduce the use and release of PBTs and other toxic substances.

I. In conjunction with the USEPA, Michigan should continue focused sampling of the Saginaw Bay watershed, specifically, the Tittabawassee River south of Midland, the Saginaw River, and Saginaw Bay, taking property use into consideration. Michigan should also continue to assess the risks of consumption of fish and wild game in the Saginaw Bay watershed and provide updated information on consumption advisories to the affected communities as it becomes available.

J. Michigan should prevent new toxic chemicals from entering the Great Lakes by promoting environmentally sensitive chemical innovations targeting production, use and sound disposal in Michigan through strategic deployment of P2 and waste minimization programs. Examples include:
   - Providing easier access and broaden participation in P2 and waste minimization programs to small and medium sized businesses.
   - "Bundling" technical assistance services, such as compliance assistance, P2, and energy efficiency (E2) audits, in "one-stop-shopping" programs.
   - Creating policies that are precautionary, and encourage research, development, and implementation of innovative chemical technologies that are environmentally safe, cost competitive, and effective.
   - Promoting the use of "green" chemical technologies that reduce or eliminate the use or generation of hazardous substances during the design, manufacturing, and use of chemical products and processes.
   - Encouraging the use of safer, less toxic, or non-toxic chemical alternatives to hazardous substances to promote sustainable economic development within the state.

K. Michigan should continue to participate in the Binational Toxics Strategy Substance/Sector Workgroup led by the USEPA and Environment Canada to address regional PTS issues.

L. Michigan should continue to work with the Agency for Toxic Substances and Disease Registry to address regional, national, and international toxic substances issues.

M. Michigan should encourage the reformulation of products with less toxic substance content by creating an information clearinghouse. The clearinghouse would provide chemical and toxicological information along with suggested chemical substitutes to industry. This will result in a significant reduction of manufacturing and use of toxic chemicals.

N. Michigan should create tax incentives and utilize low interest loans to promote investments in E2 upgrades and P2 projects.

O. Michigan should ensure that traditional regulatory programs, including enforcement, provide incentives to conduct P2 and E2 projects.

P. Michigan should implement recommendations of the Toxics Steering Group report on Polybrominated diphenylethers (PBDEs).

Q. Michigan should continue to participate in the Binational Toxics Strategy Dioxin subgroup for coordination of activities on a regional level.

Recommendations Needing Additional Funding to Accomplish

It should be noted that Michigan may have limited funding for some of the efforts identified below; however, if the Toxic Pollutants goal is to be achieved, significant new resources will be essential.

A. MDEQ should develop rules to control mercury emissions from the Portland cement sector or adopt USEPA's maximum achievable control technology standard revision (as recommended in MDEQ's Mercury Strategy Staff Report).

B. Michigan should remediate reservoir sources of dioxins and furans in contaminated environmental media, including soil and sediment, to prevent

further release of these toxic substances to the Great Lakes with the ultimate goal of lifting the fish and wild game advisories. In addition, Michigan should develop and implement cleanup plans for sites of dioxin and furan contamination that are protective of the environment and human health, including sensitive subpopulations such as children and women of childbearing age.

C. While MDA continues to fund the Michigan clean sweep centers for proper collection of cancelled or unwanted pesticides in Michigan, Michigan should commit long-term funding to ensure a robust and ongoing waste pesticide collection program. In addition, Michigan should promote take back and other waste collection programs.

D. Michigan (MDCH and MDEQ) should participate in the regional effort to create consistent advice on fish and wildlife consumption to citizens in the Great Lakes basin, with particular emphasis for sensitive populations and health care professionals. The MDCH should conduct research that includes the use of public focus groups to identify a format for fish and game advisories that are usable and understandable for all citizens of Michigan and consider providing the information in multiple languages and literacy levels.

E. Michigan should fully fund the Michigan Family Fish Consumption Guide, including funding to update, print, and distribute the Advisory, as well as, programs to provide health education messages promoting the health benefits of regular fish consumption while encouraging safe consumption of Great Lakes fish.

F. Michigan should identify watersheds or water bodies that are at risk or are currently undergoing assessment of NPS pollutant loadings such as atrazine and should develop strategies with the USEPA's GLNPO and other agencies to address these problems. In some cases, residues from registered pesticide such as atrazine continue to be detected at or below trigger levels in Michigan surface waters. As areas of concern are detected, the MDA should be directed to reduce potential NPS using available regulatory controls.

G. Michigan should identify and fill gaps in the scientific understanding that limit the ability to effectively manage the risks of toxic substances found in the Great Lakes and to identify and understand the emerging toxic substances of concern. Specifically, Michigan should implement screening/long-term monitoring of sources of toxic substances and concentrations in environmental media, including humans and wildlife to include:

- a strategic review of the Toxic Substances Control Act-regulated substances and other federally regulated substances, using current P2 models;
- enhanced Great Lakes monitoring programs to include chemicals of emerging concern; and
- conduct research on chemical properties, exposure, and long-term effects.

H. Michigan should conduct modeling, incorporating evaluation and enhancement of current models, to better predict environmental impacts of reduction actions at various geographic scales, and to examine exposure scenarios.

I. Michigan should develop an easily-accessible, centralized Great Lakes toxics database for monitoring data, emission and release information, and research results to include a clearinghouse for toxicity data to be used to develop Great Lakes Initiative (GLI) criteria, and state GLI water quality standards.

J. Michigan should investigate and explore the development of a mechanism to ensure that mercury collected or recovered in Michigan is used only for essential uses. In addition, MDEQ should explore the current barriers regarding the ability to restrict exportation of nonessential mercury uses to other states or countries (as recommended in the MDEQ's Mercury Strategy Staff Report).

K. Michigan should conducting monitoring of emerging contaminants such as pharmaceuticals and personal care products, bisphenol A and pthalates and nanomaterials to investigate potential sources, releases and impacts as well as determine adverse impacts to aquatic life from exposure to these emerging contaminants. In addition, Michigan should support research on water treatment technology and educational efforts aimed at reducing the release of emerging contaminants.

L. Michigan should implement additional pharmaceutical collection programs modeled after other successful programs, for example the Lake Superior Watershed Council's Earth Keepers Initiative.

- Michigan should develop criteria to regulate water discharges of perfluorinated compounds.
- Michigan should implement reduction activities to eliminate water discharges of emerging contaminants as identified in the State of Michigan's Environment 2008.

Recommendations Needing Congressional or Federal Agency Action

A. Michigan should work with the Great Lakes congressional delegation to support efforts to reduce regional, national, continental and global sources of PBTs to the Great Lakes basin from atmospheric transport and deposition by restoring the Great Lakes Atmospheric Deposition (GLAD) funding administered by the Great Lakes Commission.

B. Michigan should work with the Great Lakes congressional delegation to initiate and support the following actions from the Great Lakes Regional Collaboration Strategy:

- Ratification of the Stockholm Convention on Persistent Organic Pollutants.
- International PTS management and monitoring programs, in coordination with the Commission for Environmental Cooperation and the United Nations Environment Program (UNEP), and support capacity building and technology transfer programs, such as those administered by USEPA's Office of International Activities.
- Efforts to reduce international sources of mercury, including funding and technical support for UNEP's mercury efforts.

C. Michigan should work with the Great Lakes congressional delegation in support of the Great Lakes Commission's Legislative Priorities for FY 2009 that are of importance to Michigan including:

- Appropriating $2 million to USEPA GLNPO to be distributed to the states and tribes to expand the program under the Great Lakes Initiative (GLI) and continue mercury monitoring, fish contaminant assessments and community education.

D. Michigan should work with the Great Lakes congressional delegation in support of the Council of Great Lakes Governors Great Lakes Restoration and Protection Near Term Action Items For FY 2009 including:

- $1 million in 2009 in ongoing funds to continue tribal fish tissue contaminant analysis programs and related community education programs. Congress is again asked to appropriate an additional $100,000 in the 2009 budget to facilitate tribal participation in a mercury stewardship

program for the Great Lakes states.

- $100,000 for monitoring new chemical contaminants is needed in the Great Lakes Basin. Emerging chemicals of concern are little understood and pose a potentially serious threat to aquatic life and wildlife in the Basin.

Recommendations Needing Michigan Legislative Action

A. Michigan should work with the Michigan legislature to develop a long-term funding proposal to secure state funding for environmental response activities at facilities and historical sites of PTS contamination where no liable party exists to conduct remedial activities.
B. MDEQ should continue to work with the Michigan legislature to gain support for legislation requiring dental amalgam separators.
C. MDEQ should work with the Michigan legislature to pass legislation amending Part 55 to set a particulate standard to address fine particular emissions from new outdoor wood boilers and potential mercury emissions.
D. Michigan should secure long-term funding for the continued collection and proper disposal of mercury-containing items through the clean sweep sites.
E. MDEQ should work with the Michigan legislature to ensure passage of legislation that bans uncontrolled burning of household and plastic waste used in agricultural applications to reduce dioxin emissions.
F. Michigan should work with the Michigan legislature to develop a long-term funding proposal to secure state funding for P2.
G. Michigan should work with the Michigan legislature to develop long-term funding for public education and outreach surrounding the Michigan Fish Consumption Advisory. In addition, Michigan should work with the Michigan legislature to secure funding to update and revise chemical-specific trigger levels used to determine human health impacts of fish consumption and support use of the best available science to set Advisory trigger levels.

Restoration Recommendations by Watershed/Region

- To be developed after the regional input sessions -

Indicators and Information

Background

Protection and restoration of Michigan's Great Lakes watersheds require a well-documented, collaborative strategy, access to the best scientific information available, and coordinated action. A successful restoration strategy for the Great Lakes must include an informed decision making process based on consistent methods to measure and monitor key indicators of ecosystem function. Once collected, information needs to be compiled and communicated consistently to inform the restoration process, decision-makers, and the public.

Assessing progress towards restoring the Great Lakes requires a comprehensive network of monitoring/observing systems to provide high-quality data for managers, scientists, and the public to determine environmental quality status and trends and to evaluate the effectiveness of prevention, remediation, and restoration activities. As part of this effort, there is a need to identify and report on a set of responsive, scientifically valid and representative environmental indicators. In addition, it is essential that agencies collecting environmental data use standardized methods, data standards, and data management systems. To move forward in this protection and restoration process, it is important that resource managers, scientists, and the public have ready access to environmental data through user-friendly systems, and agencies to communicate information in a timely, accurate, and understandable fashion.

Success Stories

Providing Real Time Air Quality Information - In 2006, the MDEQ rolled out MIair, an Internet tool that displays near real-time data, maps, and charts. MIair provides timely air quality information for Michigan residents via the initial easy-to-understand Air Quality Index graphic for those who want simplicity, yet allowing detail for those who prefer more comprehensive technical information. The announcements and forecast portion allow MDEQ to provide updated information in real-time. MIair features the following:

- Air Quality Index (AQI) - The AQI is a health indicator useful for making decisions about daily activity levels.
- ACTION! Days - An Action! Day is issued when poor air quality is expected.
- ENVIROFLASH - EnviroFlash sends automated messages about air quality via e-mail and/or cell phones.
- Ozone Maps - The current day eight-hour average ozone concentration is reported.
- PM2.5 Maps - The current 24-hour average fine particle concentrations are reported.

Expanding Water Quality Monitoring Efforts, Michigan Clean Water Corps (MiCorps) - Governor Jennifer M. Granholm issued Executive Order 2003-15 creating the MiCorps to assist the MDEQ in collecting and sharing water quality data. The MiCorps expands volunteer water quality monitor-

ing statewide for the purpose of collecting, sharing, and using reliable data; educates and informs the public about water quality issues; and fosters water resource stewardship. The MiCorps Program provides training for stream and lake monitoring, disseminates methods for accurate data collection, implements effective quality assurance practices, facilitates reporting and information sharing online, and provides a forum for communication and support among volunteer monitoring groups in Michigan.

Michigan's Great Lakes Indicator-Information Goal

Standardize and enhance scientifically valid methods by which information is collected, recorded and shared within Michigan to provide high-quality data for managers, scientists, and the public to measure environmental quality status and trends and to evaluate the effectiveness of prevention, remediation, and restoration activities

Priority Actions

- To be completed at a later date -

Near Term Actions

- To be completed at a later date through the prioritization process -

Recommendations that Can Be Accomplished within Existing Funding Constraints through Increased Collaboration

It should be noted that Michigan currently has limited funding for the efforts identified below; however, if the Indicator-Information goal is to be achieved, continuation of existing programmatic funding is essential.

A. Michigan should continue to work with the other Great Lakes states, federal and local interests to develop and improve a comprehensive network of monitoring/observation systems to provide high-quality data for managers, scientists, and the public to measure environmental quality status and trends and to evaluate the effectiveness of restoration and prevention activities. This network should be continually improved to adapt to technological advances and emerging needs. This effort should include:
   - Continually updating (every three years) the Michigan portion of the Great Lakes Commission's Great Lakes monitoring inventory.
   - Developing a clear articulation of monitoring objectives to ensure effective, efficient monitoring. A panel with representatives from state monitoring agencies should be convened to identify Great Lakes management and information needs.

- Identifying existing monitoring gaps and proposing options for filling those gaps.
- Re-assessing the overall Great Lakes monitoring effort to ensure that activities are efficient, produce useful data and meet management objectives.
- Communicating the information needs for Great Lakes restoration to Great Lakes interagency groups (i.e., Lake Technical Committees of the Great Lakes Fishery Commission, Great Lakes Interagency Task Force, Great Lakes Observing System, Integrated Earth Observation System, and Integrated Ocean Observing System as part of the Global Earth Observing System of Systems).
- Continuing to support the National Wetlands Inventory (NWI) Update being completed by Ducks Unlimited. Following the completion of the current project, support for continued updating of the NWI to monitor long-term wetlands trends is essential.

B. Michigan should identify and report on a set of responsive, scientifically valid, and representative environmental indicators. This should include:
   - Reviewing the State of the Lakes Ecosystem Conference (SOLEC) indicators to identify those already being assessed in Michigan and to determine others that could be efficiently incorporated into existing activities.
   - Reviewing indicator needs identified in other assessments of information needs (e.g., Michigan's Wildlife Action Plan, The Nature Conservancy's Aquatic Ecoregional Planning document, Great Lakes Regional Needs Assessment, Great Lakes Regional Research Information Network, and the Prescription for Great Lakes Ecosystem Protection and Restoration.)
   - Identify and defining the desired endpoints and periodically re-assessing indicators to ensure relevancy and effectiveness.
   - Reviewing the Michigan State of the Great Lakes Report as a reporting mechanism for indicators.
   - Collectively undertaking a "big picture" look at the status of the Great Lakes.

C. Michigan should seek to work with all agencies collecting environmental data to standardized methods, and to develop data standards and data management systems. Decision-support tools should be flexible and offer enhanced abilities for multi-participant decision making. Predictive modeling tools should be applied to priority restoration issues, where appropriate. This includes:
   - When multiple agencies collect similar types of data (e.g., fish community, bacteria in water), using consistent or comparable methods should be encouraged to allow for more efficient data aggregation and reporting.
   - Investing in the most up-to-date but proven technology for monitoring and decision-support.
   - Following the 2004 Environmental Data Standards Council's Environmental Sampling, Analysis, and Results protocol, that includes voluntary guidelines to improve data consistency and comparability.
   - For monitoring projects, following approved Quality Assurance Project Plans to allow users assess to data quality.
   - Using common database and Geographic Information System (GIS) software, as feasible, to encourage data consistency and sharing.
   - Supporting the collection and use of voluntary monitoring data, as appropriate.

D. Michigan should ensure that resource managers, scientists, and the public have ready access to environmental data through user-friendly systems, and agencies communicate information in a timely, accurate fashion. This includes:
   - Periodically updating, expanding and evaluating the Michigan Surface Water Information Management System to include additional databases

from other media.

- Redesigning the Michigan Air Emissions Reporting System.
- Housing environmental data in searchable databases and maps that are accessible on the Internet, including land and resource use restrictions that have been imposed to protect the public and the environment from hazards at contaminated sites. Existing examples include the fish contaminant monitoring database and the beach monitoring database.
- Investing additional resources to develop, manage, and maintain databases and database applications to ensure easy access by multiple users.
- Consider reorganizing the triennial MDEQ/MDNR State of the Environment Report from reporting on a program-specific basis to one integrating data across media and possibly by area (e.g., Great Lakes nearshore, coastal, and tributary/upland).
- Collecting and aggregating existing data sets to populate the Great Lakes GIS and the Great Lakes bottomlands GIS, including an inventory of existing data sets and identification of data and information gaps (MDEQ and MDNR).
- Developing an atlas of Michigan's Great Lakes coast through identification of existing data sets and creating a web-based coastal atlas (MDEQ and MDNR).
- Continuing to provide current wetland geographic information to Michigan citizens in a readily usable format.
- Continuing to support the development, including staff training, of biological assessment field manuals, which are currently being prepared by Michigan State University and Central Michigan University using the most current Michigan-specific protocols.

E. Michigan should develop research and assessment and reporting systems related to energy issues, including:
   - Development of a process for measuring and reporting energy consumption to be used by all state departments, including a mechanism to calculate each department's carbon footprint.
   - Development of a GIS-based decision support tool for lakebed alteration in association with windmill siting (in cooperation with MDNR Fisheries and University of Michigan), completing lakebed mapping, review and identifying gaps in datasets.

Recommendations Needing Additional Funding to Accomplish

It should be noted that Michigan may have limited funding for some of the efforts identified below; however, if the Indicator-Information goal is to be achieved, significant new resources will be essential.

A. Michigan should develop a wetland-related monitoring and reporting program including:
   - Developing a statewide program to assess wetland condition by incorporating the evaluation of wetlands into routine basin-wide water quality monitoring including development of a wetland monitoring framework and ensuring wetland monitoring results are incorporated into federal water quality reports.

- Using the Michigan Rapid Assessment Method (MiRAM), a sample of wetlands should be evaluated including field testing of MiRAM and provide training to agency staff.
- Implementing bioassessment protocols developed by Michigan State University and Central Michigan University and the Great Lakes Coastal Wetland consortium in a statistically significant number of wetlands.
- Conducting NWI and landscape level functional assessments in major watersheds of the Lower Peninsula, including training workshops for local planners and watershed groups. In the future, continue to create functional assessments for developing areas in the Upper Peninsula.
- Evaluating MDEQ's ability to implement a long-term monitoring program for Great Lakes coastal wetlands.

Recommendations Needing Congressional or Federal Agency Action

A. Michigan should work with the Great Lakes congressional delegation to increase the capacity to assess trends to observe long term change and detect the emergence of new issues (e.g., new invasive species). The SOLEC process to develop indicators should be completed for a full suite of 80 indicators, with particular attention to the use of indicators that will measure the success of the measures recommended in the GLRC Strategy. Additional funding of $800,000 should be provided toward this end. In addition, a "top ten" list of indicators should be developed and reported to the public on an annual basis.

B. The Great Lakes Federal Interagency Task Force should be asked to review monitoring programs among its member agencies to ensure effective and efficient gathering and reporting of data. The Task Force should coordinate with the States and Tribes to optimize the effectiveness of monitoring investments throughout the region.

C. Michigan should work with the Great Lakes congressional delegation to implement and support the following actions from the Great Lakes Regional Collaboration Strategy:
   - Supporting Great Lakes restoration activities with appropriate scientific foresight, planning and assurance of results.
   - Providing adequate funding to support a Great Lakes Research Office as authorized in the 1987 Clean Water Act Amendments (33 U.S.C. 1268) to coordinate these research efforts and the overall federal research budget to the Great Lakes should be doubled over the next five years.
   - Dedicating at least 10 percent of all new appropriations in support of Great Lake' restoration activities toward research to aid planning and assessment.

D. Michigan should work with the Great Lakes congressional delegation in support of the Great Lakes Commission's Legislative Priorities for FY 2009 that are of importance to Michigan including:
   - Passing the Coastal and Ocean Observation System Act (S. 950) and appropriating $150 million annually to NOAA to implement the Act, with an equitable share to support the Great Lakes Observing System.

Recommendations Needing Michigan Legislative Action

A. The MDEQ should work with the Michigan Legislature to develop a long-term program to secure state funding for water quality monitoring and monitoring in restoration projects.

Restoration Recommendations by Watershed/Region

- To be completed after local public meetings -

Sustainable Development

Background

In the 1987 Report of the Brundtland Commission, Our Common Future, the term sustainable development is defined as:

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Natural land-based (along with water and air) resources must remain sound if our lives are to be healthy and our land is to support economic potential and social vitality. If the goal of sustainable land development is to be met, the needs and acknowledged challenges of the economy, the environment, and communities, a transformation will be needed from competition to collaboration among interests that plan for development and manage the land. To do this, a path to development must be envisioned that emphasizes efficient, careful and integrated resources utilization, protection, and reuse, along with ecosystem protection and restoration.

Sustainable development is a process utilized toward achieving balance between economic, societal, and ecological needs within an ecosystem. The Great Lakes are of global significance yet our region has not fully integrated the philosophy of sustainability into all aspects of the use, development, restoration, and conservation of Great Lakes resources. Sustainability works from the bottom-up, and is rooted in the actions and decisions by individuals, private enterprises and local communities.

Success Stories

Protecting Michigan's Groundwater – The Michigan Department of Agriculture (MDA), in conjunction with Michigan's conservation districts, works with farmers and landowners through a variety of programs to voluntarily adopt practices that are environmentally and economically sustainable and that contribute to the vitality of rural communities. One of those programs, the Michigan Groundwater Stewardship Program (MGSP), is a legislatively enabled partnership, which helps Michigan residents reduce the risks of groundwater contamination associated with pesticide and nitrogen fertilizer use. The MGSP effectively addresses these risks through a variety of program areas that target agricultural, residential, and golf course user groups. Through a contribution agreement with the USDA, the MGSP has been able to leverage federal resources to assist landowners implement over 300 conservation practices. Through the sustainable use practices promoted by the MGSP and other programs, Michigan's agricultural community will continue to be a part of the solution in reducing risk to our environment.

Sustainable Grand Rapids – Grand Rapids is now recognized as a city committed to creating a new municipal government paradigm built on local solutions, stakeholder involvement, regional collaboration, and community reinvestment. Lead by progressive politicians, aggressive administrators, and collaborative community stakeholders, the City, following the lead of local well-established and successful businesses, non-profits, faith-based, and academic partners in the search for sustainability, now finds itself in the company of other popular sustainable regions in the nation highly desired as places to live, work, learn, and play. Adopting the philosophy of "living today without jeopardizing the ability of future generations to live equally as well or better," the City Commission approved the position of Sustainability Manager in January 2007 to begin addressing the challenges of the next century and the issues founded in the past one. Community leaders embraced sustainability with others around the country and began looking for transformational changes in the community that would move Grand Rapids into the future as a stronger and more viable city. Waste elimination, energy and water conservation, renewable energy development, construction of Leadership in Energy and Environmental Design (LEED)-certified buildings, illiteracy, homelessness, new job creation, and local economic development are some of the areas identified for change to move the community forward in a positive manner.

Michigan's Sustainable Development Goal

The activities of Michigan's citizens and public and private entities support a strong and vibrant Michigan economy, meeting societal and cultural needs while incorporating the principles of sustainability into their practices and sharing a sense of commitment to protect and enhance and be wise stewards of the waters, lands and related resources of the state of Michigan.

Priority Actions

- To be completed at a later date -

Near Term Actions

- To be completed at a later date –

Recommendations that Can Be Accomplished within Existing Funding Constraints through Increased Collaboration

It should be noted that Michigan currently has limited funding for the efforts identified below; however, if the Sustainable Development goal is to be achieved, continuation of existing programmatic funding is essential.

A. Michigan should adapt and maintain programs that promote sustainability across all sectors, governmental and non-governmental, public and

private. All state and local agencies and institutions, as appropriate, should develop and implement sustainable development principles applicable to regulatory and funding actions and to the state government's own operation. Such principles must include insuring that adequate resources are provided for activities that would support sustainable development. The statement of principles should include:

- Committing to the principles of sustainable development, to the protection and restoration of a strong and resilient environment, and to the maintenance of ecosystem services that are essential for a strong economic future.
- Ensuring that the state's activities will, to every extent possible, avoid promoting development that will directly or cumulatively contribute to the degradation of the Great Lakes or the states other water, air, land or biotic resources.
- Encouraging development that balances the social and cultural needs of Michigan's citizens with the need to maintain diverse and resilient ecosystems.
- Encouraging Smart Growth opportunities within Michigan communities.

B. Michigan should take actions to ensure that state and local governance is aligned to enhance sustainability planning activities and sustainable resource management, including:

- Working with all interested parties to develop sustainability indicators and utilizing those indicators to measure continual improvement and as a guide in state government decision making and action.
- Applying integrated resource planning techniques and the precautionary principle to all regulatory actions regarding infrastructure development.
- Making available model ordinances incorporating best management practices and having success in achieving environmental goals.
- Supporting mitigation in a manner consistent with the principles of sustainable development.
- Continuing to promote programs that will reduce the impact of natural hazards, including flood management, stormwater management, and management of high risk erosion areas.
- Continuing maintenance and improvement of the state's surface water conveyance and storm water infrastructure with an emphasis on:
  - Managing surface water flows to encourage infiltration,
  - Providing greater and more diverse incentives or regulatory capability for riparian stewardship practices, and
  - Increasing investment in hydrography data by enhancing the stream gauge network and performing a comprehensive public drain inventory.
- Continuing the development of the Port Cities Collaborative.
- Continuing the working partnerships through the Saginaw Bay Coastal Initiative.
- Holding a green jobs conference and report on the status of Green Jobs Initiative.
- Supporting the long-range transportation plan goal of stewardship associated with being good stewards of Michigan's transportation resources.
- Developing methods to assist state and local effort to identify the actual cost of services provide (total cost accounting, triple bottom line), including identification of environmental costs.

C. Michigan should take actions necessary to ensure state, local, federal, and tribal partnerships are strengthened and that outreach brands Michigan and the Great Lakes as an exceptional, healthy, and competitive place to live, work, invest, and play. This includes:

- Strengthening collaboration among state agencies and incorporating public participation.
- Educating and providing information about best sustainability practices to all county, local and tribal governments in Michigan.
- Promoting the tenets of Smartgrowth through public outreach and inter-agency forums.
- Integrating water quality improvement within the Smartgrowth message in the Citizen Planner Program.
- Increasing the number of lodging establishments certified under Michigan Green Lodging Program.
- Building on Michigan's heritage by promoting the development of underwater preserves within Michigan waters.
- Supporting inclusion of Michigan's Marine Protected Areas in the national system of Marine Protected Areas.
- Increasing public participation in green home tours offered by community energy centers.
  - Michigan should support the recommendations of the GLRC Strategy that support sustainable development such as:
- Conducting demonstration projects using the best available technologies and practices.
- Enhancing online clearinghouses to provide additional capacity for education and outreach, tourism and products, and local watershed planning initiatives.
- Enhancing the capacity of local communities to apply sustainability through training and technical assistance.
- Initiating new and maintain existing watershed or regional partnerships with emphasis on rural, multi-ecosystem watersheds that incorporate sustainable criteria.
- Enhancing the capacity of Great Lakes ports and marinas to implement best management practices.
- Creating new awards to recognize excellence in sustainable development within the Great Lakes including programs for excellence in energy efficiency.
- Developing additional education and outreach modules on sustainability and promote their incorporation into school curriculum.
- Supporting federal efforts to implement diesel retrofit programs by supporting and encouraging local efforts to seek and secure grants to conduct retrofit programs.
- Supporting the use of injection wells for carbon sequestration in regional brine aquifers and for enhanced oil and gas recovery by participating in the Midwest Regional Carbon Sequestration Partnership and promoting passage of appropriate legislation.
  - In its own operations, Michigan state government should set an example by applying sustainability criteria and the precautionary principle in the development of all management plans and programs. This includes identifying and celebrating success stories and actively sharing information with all county, local, and tribal governments.
  - Michigan should proactively address climate change mitigation and adaptation by completing in-state efforts, such as the Michigan Climate Action Council process and development and implementation of a comprehensive Climate Change Plan for Michigan. Michigan should also continue working with other Midwestern states to implement the Midwestern Greenhouse Gas Reduction Accord.

Recommendations Needing Additional Funding to Accomplish

It should be noted that Michigan may have limited funding for some of the efforts identified below; however, if the Sustainable Development goal is to be accomplished, continuation of existing programmatic funding with additional funding will be required.

A. Michigan should provide leadership for sustainable development by:
   - Developing a long-term funding proposal for brownfield redevelopment grants and loans.
   - Developing a long-term funding proposal for waterfront improvements that support sustainable development.
   - Improve the use and reuse of our lands by implementing recommendations of the 2003 Michigan's Land, Michigan's Future land use report.

B. Michigan should implement Governor Jennifer M. Granholm's Green Chemistry Executive Directive by awarding green chemistry grants to build a base for green chemistry and the creation of a Green Chemistry Award Program.

C. Michigan should support and encourage the use of solar and wind power through continued mapping, technical assistance, grants, anemometer loan programs, and regulatory action.

D. Michigan should support continued technical assistance, education and outreach, and grants to encourage low impact development practices and other stormwater control and management techniques.

Recommendations Needing Congressional or Federal Agency Action

A. Michigan should work with the Great Lakes congressional delegation to initiate and support the following action from Great Lakes Regional Collaboration Strategy:
   - Requiring Federal agencies to review existing grant, loan and subsidy programs and incorporate sustainability criteria to provide priority for those projects that pursue sustainable objectives.
   - Increasing funding for Federal and state grant programs that encourage communities to re-use brownfields and to revitalize lakeside and tributary waterfronts.
   - Increasing Federal funding for development of an implementation plan for the recommendations in the GLRC Strategy that utilizes sustainable development as the overarching guide.

B. Michigan should work with the Great Lakes congressional delegation in support of the Great Lakes Commission's Legislative Priorities for FY 2009 that are of importance to Michigan including:
   - Reauthorizing the Clean Water Act with provisions that USEPA review prioritization formulas so that projects that advance sustainable development principles can be awarded higher priority for funding or a more favorable loan interest rate.

- In addition to restoring funding for the Clean Water State Revolving Fund, fully funding the Drinking Water State Revolving Loan Fund and increasing flexibility in how the funds may be used for upgrading water infrastructure and improving water conservation and use efficiency.

Recommendations Needing Michigan Legislative Action

A. Michigan should support sustainable energy production and consumption in state government operations, in all of the state's related regulatory capacities, through all forms of state financial assistance, and as a primary component of all economic development programming.
B. Michigan should proactively address climate change mitigation and adaptation.
C. Michigan should promote the adopting of new commercial and residential energy codes that provide energy savings equivalent to similar codes in other Great Lakes states.

Restoration Recommendations by Watershed/Region

- To be completed after local public meetings -

Acronyms

AIS - Aquatic Invasive Species
ANSTF - Aquatic Nuisance Species Task Force
AOCs - Areas of Concern
AQI - Air Quality Index
BEACH Act- Beaches Environmental Assessment and Coastal Health Act
BUIs - Beneficial use impairments
BMPs - Best Management Practices
CMI – Clean Michigan Initiative Bond
CELCP - Coastal and Estuarine Land Conservation Program
CNMP - Comprehensive Nutrient Management Program
CREP - Conservation Reserve Enhancement Program
CSO - Combined sewer overflow
CTAI - Conservation Technical Assistance Initiative
CZMA – Coastal Zone Management Act
DDT - Dichloro-Diphenyl-Trichloroethane
E2 - energy efficiency
EQUIP - Environmental Quality Incentives Program
FSA - Federal Farm Service Agency
GIS - Geographic Information System
GLI - Great Lakes Initiative
GLRC - Great Lakes Regional Collaboration
GLWQA - United States/Canada Great Lakes Water Quality Agreement
GLNPO - USEPA Great Lakes National Program Office
HACCP - Hazard Analysis and Critical Control Point
IAT - Internal Action Teams
LEED - Leadership in Energy and Environmental Design
Legacy Act - Great Lakes Legacy Act
MAEAP - Michigan Agriculture Environmental Assurance Program
MiCorps - Michigan Clean Water Corps
MDA - Michigan Department of Agriculture
MDCH - Michigan Department of Community Health
MDEQ - Michigan Department of Environmental Quality
MDNR - Michigan Department of Natural Resources
MGSP - Michigan Groundwater Stewardship Program
MiRAM - Michigan Rapid Assessment Method
MUCC - Michigan United Conservation Clubs
NEWMOA - Northeast Waste Management Officials' Association
NOAA - National Ocean and Atmospheric Administration
NPS - Nonpoint source
NAWCA - North American Wetlands Conservation Act
NWI - National Wetland Inventory
OGL - Office of the Great Lakes
P2 - pollution prevention
PCBs - Polychlorinated biphenyls
PBTs - Persistent bioaccumulative toxics
PTS - Persistent toxic substances
RAP - Remedial Action Plan
SRF - State Revolving Fund
SSOs - Sanitary Sewer Overflows
SOLEC - State of the Lake Ecosystem Conference
SWP - Source Water Protection
TMDL - Total Mass Daily Load
USDA - United States Department of Agriculture
USACOE - United States Army Corps of Engineers
USEPA - United States Environmental Protection Agency
USFWS - U.S. Fish and Wildlife Service
WRP - Wetland Reserve Program

To submit comments on the DRAFT MI Great Lakes Plan, contact:

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